

Vulnerable Road Users Safety Study

Old North Road

Worthington, MA



September 2025



Prepared by:



Pioneer Valley
Planning
Commission

Prepared in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation – Federal Highway Administration. The views and opinions of the authors (or agency) expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

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The Town of Worthington requested the Pioneer Valley Planning Commission (PVPC) to conduct a Vulnerable Road User (VRU) Safety Study along Old North Road (Route 143), focusing on the area near the Maples Senior Housing, the Hilltown Community Health Center, and the farm stand. This study is a part of the PVPC's Unified Planning Work Program for 2025.

To assess VRU safety concerns and gather input from local stakeholders and advocacy groups, the PVPC organized a Vulnerable Road User Safety Assessment (VRUSA) in collaboration with Town officials, MassDOT, the Hilltown Community Development Corporation, representatives from the Maples Senior Housing and Hilltowns Community Health Center and concerned residents. This report documents the VRUSA process and summarizes key findings. It includes an analysis of existing traffic volumes and vehicle speeds and explores potential roadway improvements to enhance safety and accessibility for all users. The following sections provide an overview of the study area, an evaluation of current conditions, and a set of recommended strategies to improve traffic operations and pedestrian safety.

Study Area

The study area encompasses the segment of Old North Road (Route 143) extending from the Worthington Inn in the southeast to just north of the Hilltown Community Health Center. This portion of Route 143 is classified as a rural major collector and serves as a key access route to The Maples Senior Housing, the Hilltown Community Health Center, and the Four Corners farm stand. The roadway runs in a northwest–southeast direction, connecting the center of Worthington with the neighboring communities of Windsor and Cummington. This segment was resurfaced in 2020 with funding from the Transportation Improvement Program (TIP), improving its pavement condition, however pedestrian or vulnerable user infrastructure enhancements were not a part of these recent improvements. There are currently no sidewalks provided along Route 143 in this area.

The Maples Senior Housing, located within the study area, is an affordable housing development for seniors aged 62 and older or individuals with a disability. The complex consists of 22 units and houses approximately 21 residents, with an average age exceeding 75 years. Adjacent to the housing is the Worthington branch of the Hilltown Community Health Center (HCHC), a commercial facility that includes various medical offices and services.

Residents of the Maples and the patrons and staff of the HCHC frequently walk along Route 143 on both sides of the roadway. Pedestrians also regularly cross the road to visit the local farm stand and access a popular dog walking path located at the eastern edge of Four Corners Farm. Notably, the farm stand was previously situated further south. A new larger facility has recently been developed at a site directly across from both the Maples and HCHC. This new location now serves prepared meals and refreshments besides fresh produce and has further increased pedestrian activity in this area, heightening the need for improved safety measures, such as a crosswalk as well as traffic calming infrastructure.

This section of Route 143 consists of one lane in each direction, with a posted speed limit of 35 mph. Despite this limit, speeding is a persistent problem along this stretch. The roadway lacks both sidewalks and a designated crosswalk, creating unsafe conditions for pedestrians.

Figure 1: Study Area



Residents of the senior housing facility often cross the road to visit the farm stand as well as walk along the shoulder—particularly on the southeastern side of the road—to reach Worthington Corners, located less than 1,500 feet to the southeast. Worthington Corners includes several key destinations and trip generators such as a convenience store, the historical society building, the Council on Aging Center, and the public library.

Due to the absence of pedestrian infrastructure and the high volume of vulnerable road users, including seniors, both the residents and management of the senior housing facility—as well as patrons of HCHC and other community stakeholders—have strongly advocated for the installation of a crosswalk. The proposed crosswalk would greatly improve safety and accessibility for elderly residents and others seeking to reach essential community services.

As shown in Figure 2, PVPC utilized a drone to assist in assessment of the study area. The drone video linked¹ here highlights the study area and the significant points of interest along Old North Road moving along the southeast direction from north of the HCHC to the Worthington Corners roundabout.

¹ <https://youtu.be/-l7obLzqmT4>

Figure 2: Drone Image of the Study Area (facing East/Southeast)



Figures 3 and 4 were captured during the field visit in the month of July. An elderly pedestrian is observed crossing the road midblock and an electric bicyclist is observed along the northwestern side of the road. Several VRUs were observed during field visits by numerous staff during different hours of the day.

Figure 3: Elderly Pedestrian Crossing the Road



Figure 4: E-Bicyclist Along the Northeast Side of the Road



Existing Conditions

This section provides a technical evaluation of the transportation components for the intersection. It includes a presentation of the data collected, analysis of traffic operations, and a series of observations and conclusions derived from the analysis.

Traffic Volume

The Pioneer Valley Planning Commission (PVPC) collected daily traffic counts, vehicle classification, and speed data at two locations in the vicinity of the study area during weekdays: south of Cummington Road and north of Buffington Road. The volumes obtained from the counts have not been adjusted with seasonal adjustment factors for the purpose of analyses in this report. Appendix 2 summarizes the traffic counts separated by direction of travel. Table 1 represents the Average Daily Traffic along each approach separated by direction of travel. In addition to traffic volume, the data also included vehicle classification. It was observed that more than 8% of the total vehicles in the vicinity of the study area were classified as Buses or Heavy Vehicles with 2 axles - 6 tires or more than 2 Axles.

Table 1: Average Daily Traffic (ADT)

Old North Road (Route 143)	Eastbound/ Southeast bound	Westbound/ Northwest bound	Total
South of Cummington Road	708	690	1398
North of Buffington Road	753	748	1501

Traffic Speed

Speeding along Route 143 emerged as a primary concern among local residents, elected officials, Department of Public Works (DPW) staff, and the Police Department during field interviews and the VRUSA. The speed limit varies across several segments near the Town Center and the Worthington Corners roundabout. Figure 5 illustrates the Speed Map for this area, based on data from the 2024 MassDOT Road Inventory. This information was imported into ArcGIS Pro 3.5 where road centerline features were symbolized according to the speed limit field. To ensure accuracy, speed limit data was cross-verified using Google Street View and official speed regulations provided by MassDOT, dated January 1993. The corresponding ordinance is included in Appendix 3.

Appendix 4 depicts the data for the travel speed of vehicles collected by the PVPC along both locations separated by direction of travel. Table 2 depicts the average and the 85th percentile travel speed. The 85th percentile speed is the speed at which traffic is travelling at or below. It is one of the key metrics utilized in determining travel speed trends along roadways. The average and the 85th percentile speeds are elevated at the northern and the southern locations, with notably higher speeds observed in the north of the study area. In contrast, the southern segment is situated near a horizontal curve and a roundabout. Both of these geometrical features of the roadway act as traffic calming measures that likely reduce speeds.

Figure 5: Speed Limit Map in the Vicinity of the Study Area

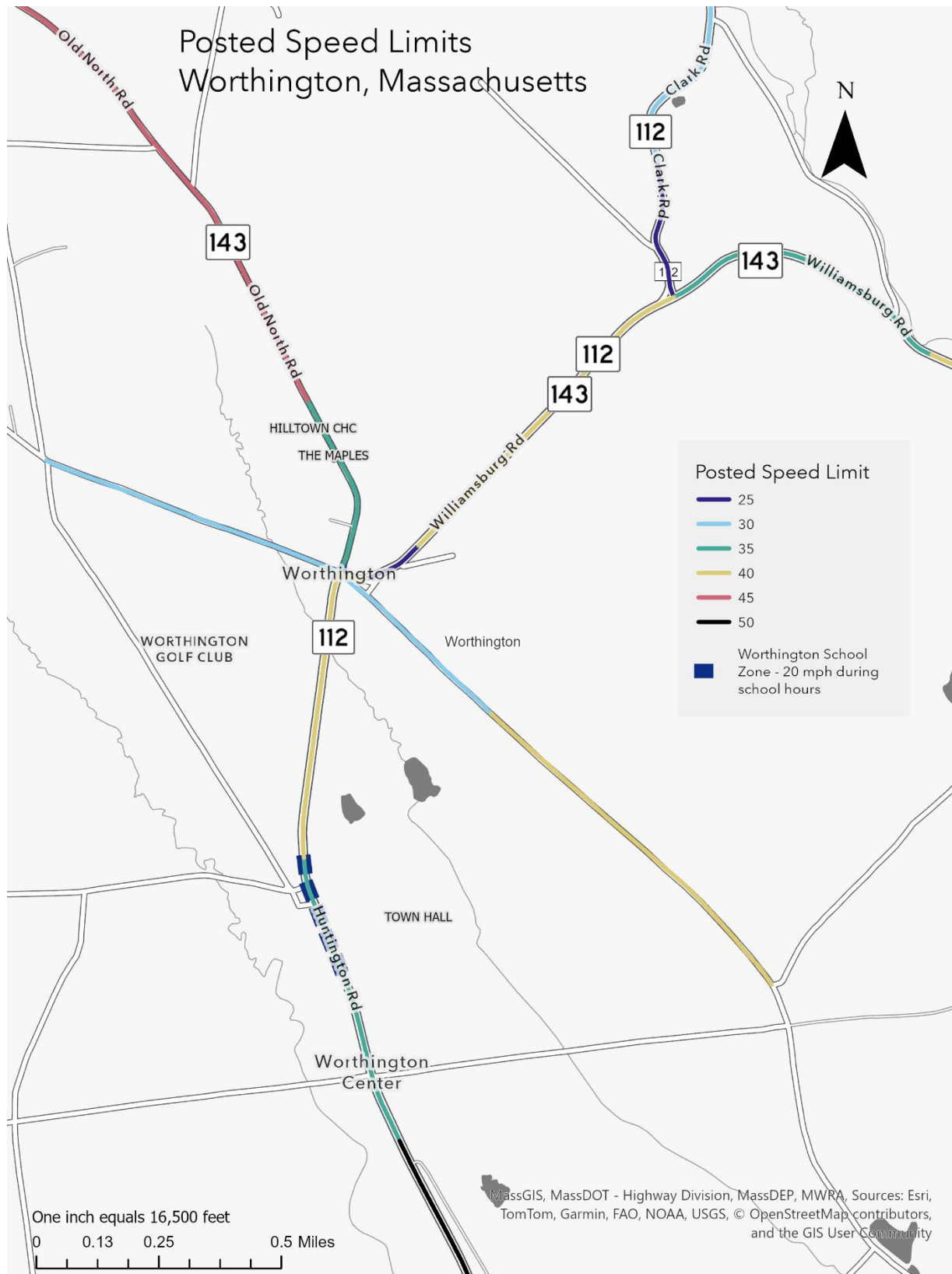


Table 2: Mean Speeds and 85th Percentile Speeds in miles per hour (mph)

	East/Southeast Bound		West/Northwest Bound	
Speed Limit is 35 mph	Average Speed	85th Percentile Speed	Average Speed	85th Percentile Speed
South of Cummington Road	49.1 mph	56 mph	45.3 mph	51 mph
North of Buffington Road	37.7 mph	42 mph	38.9 mph	44 mph

These numbers in the table above represent combined averages over the entire data collection period for all vehicles and do not reflect the proportion of vehicles exceeding the posted speed limit. To get a better understanding of the percentage of vehicles travelling above the speed limit the speed data along the northern location was further classified into 5 mph ranges to identify the percentage of traffic in each range. This information is presented in Figures 6 and 7.

Figure 6: Percentage of Vehicles by Travel Speed East/Southeast Bound

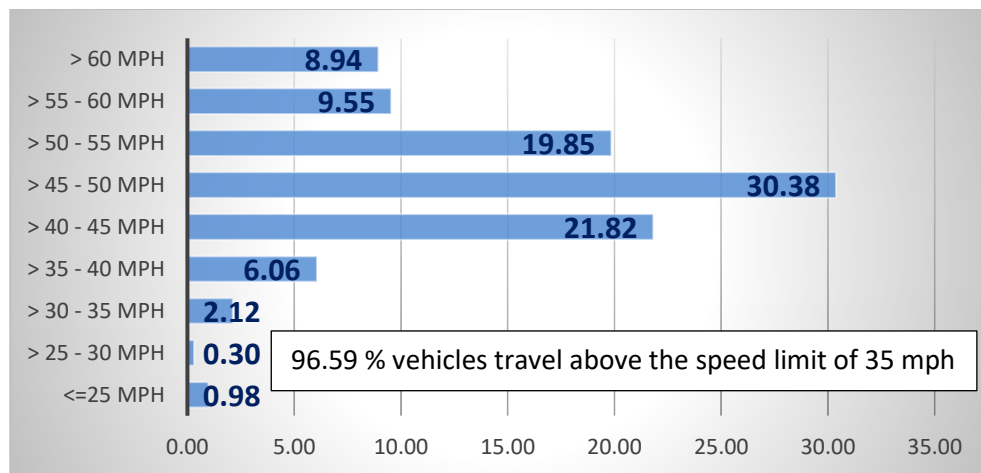
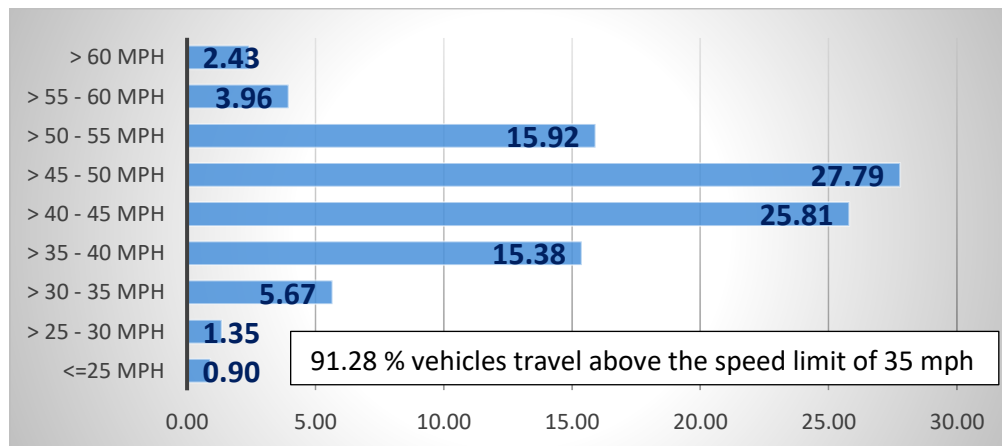


Figure 7: Percentage of Vehicles by Travel Speed West/Northwest Bound



It is observed that more than 90% of vehicles exceed the speed limit of 35 mph travelling in both directions along the study area. More than 20% of vehicles travel above 50 mph which is significantly higher than the posted speed limit. This finding reinforces stakeholders' concerns that speeding poses a serious risk to vulnerable road users in this area. Such high speeds significantly increase the probability of a serious injury or fatality as result of a collision with a vulnerable road user.

Speeding Citations and Warnings

The Worthington Police Department provided a summary of traffic offenses in the Town since 2019. Over this past five-year period, more than 62 speeding violations have been recorded town wide, with 22 occurring along Old North Road in the vicinity of the study area. On a few occasions, officers reported vehicles traveling at speeds exceeding 70 mph. The concerns raised by the residents confirm these trends. Based on these observations, it is inferred that traffic calming measures are warranted along Old North Road to improve VRU safety.

Peak Hour Volume and Turning Movement Counts

Turning Movement Counts (TMCs) were conducted for three driveways in the study area (2 for HCHC and one for the Maples) during the morning and afternoon peak hours. The weekday peak commuter period occurs during the morning hours of 7:00 AM to 10:00 AM and the afternoon hours of 2:00 PM to 6:00 PM. The TMC's were conducted to identify the peak four consecutive 15-minute periods of traffic through the intersection. These consecutive peaks 15-minute periods constitute a location's Peak Hour Volume. The peak hour of traffic volume represents the most critical period for operations and will be the focus for some of the analysis conducted in this study. Figures 8 and 9 depict the morning and afternoon peak hour interval and volumes along these locations.

The area is busier in the afternoon compared to the morning. The northern driveway of the health center has no trips recorded during either peak hour. Vehicles predominantly utilize the driveway located in the south which is located directly across from the approach road for the new farm stand / store building.

Figure 8: Morning Peak Hour Turning Movement Counts (7:15 am to 8:15 am)

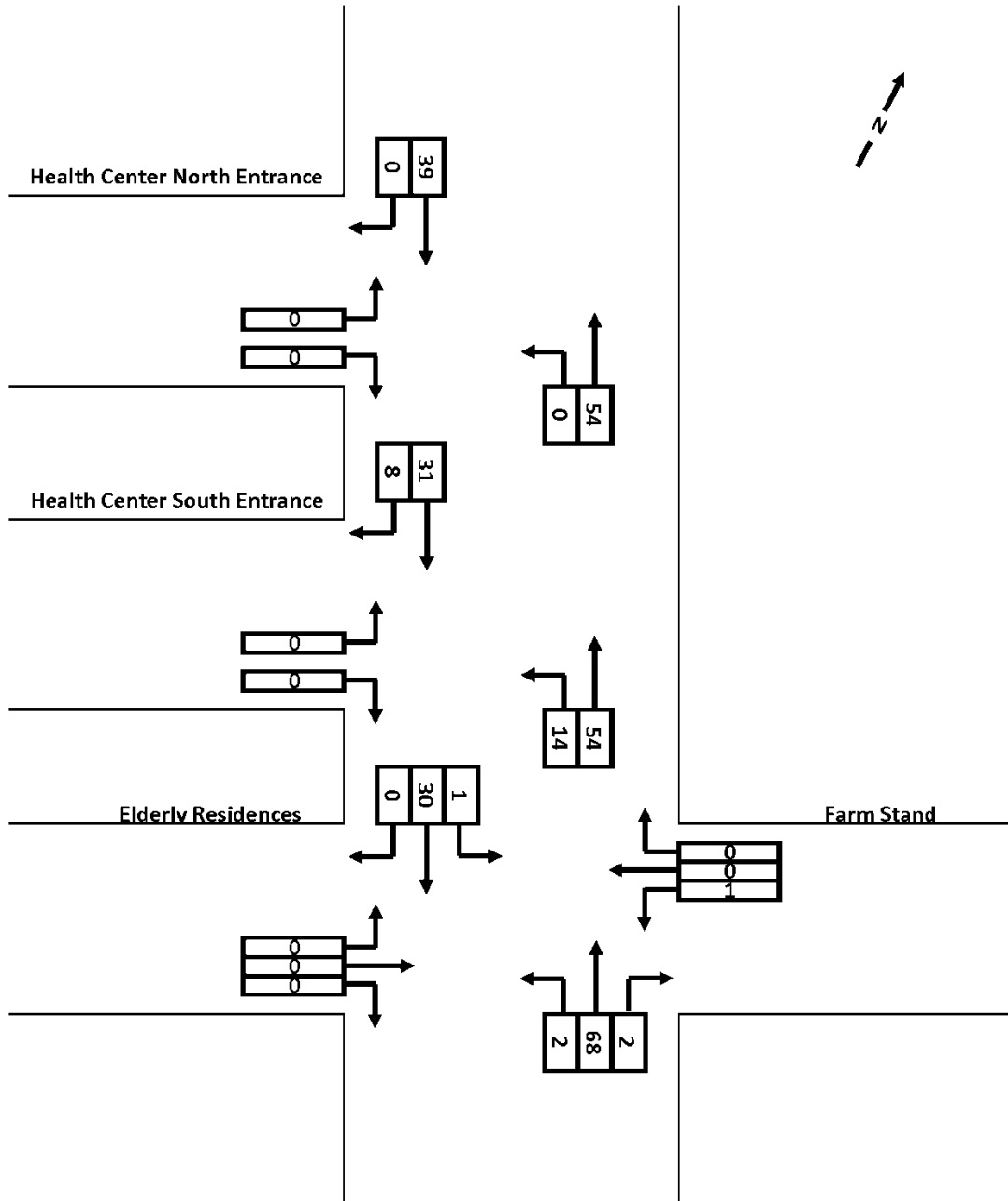
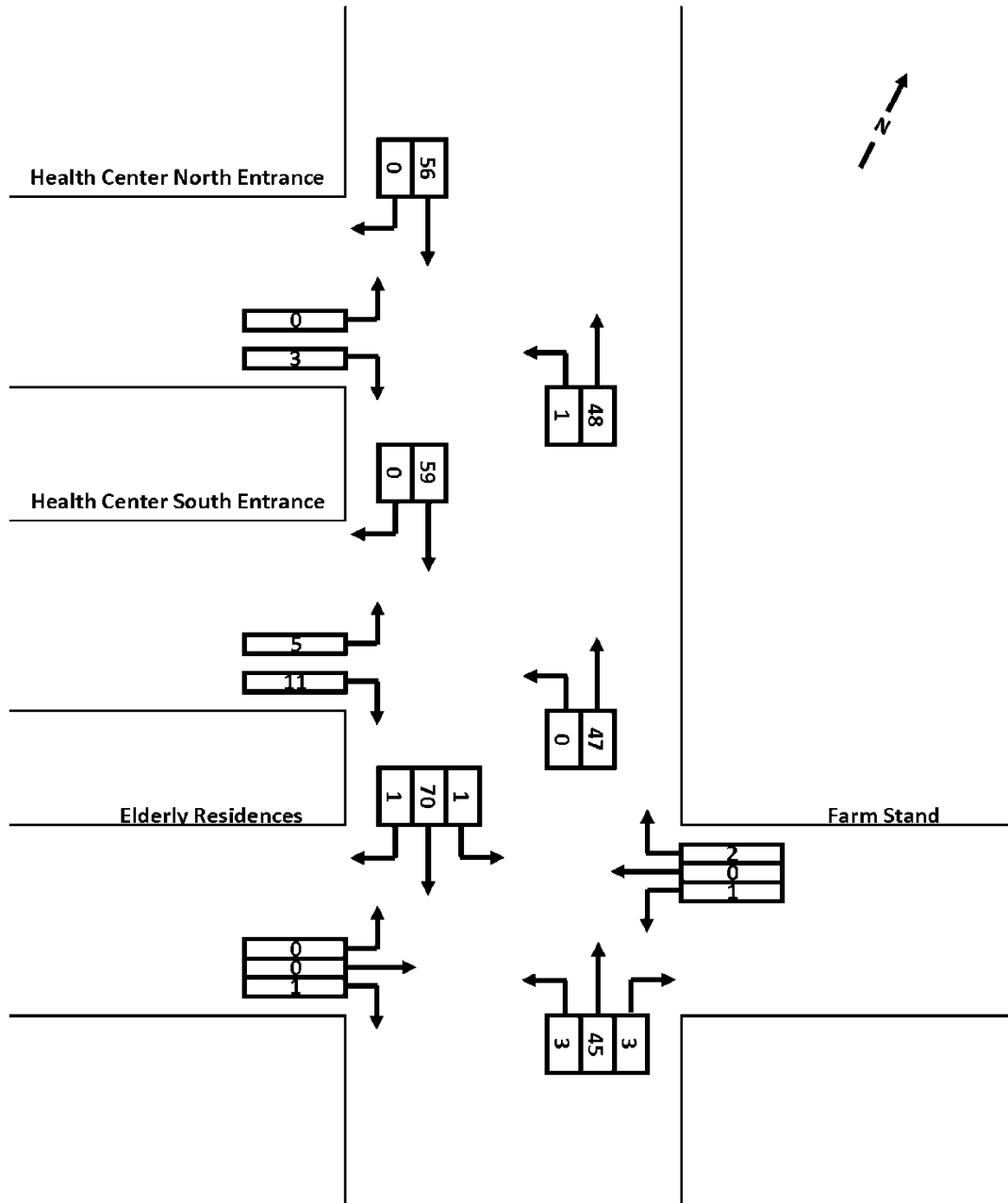


Figure 9: Afternoon Peak Hour Turning Movement Counts (4:00 pm to 5:00 pm)

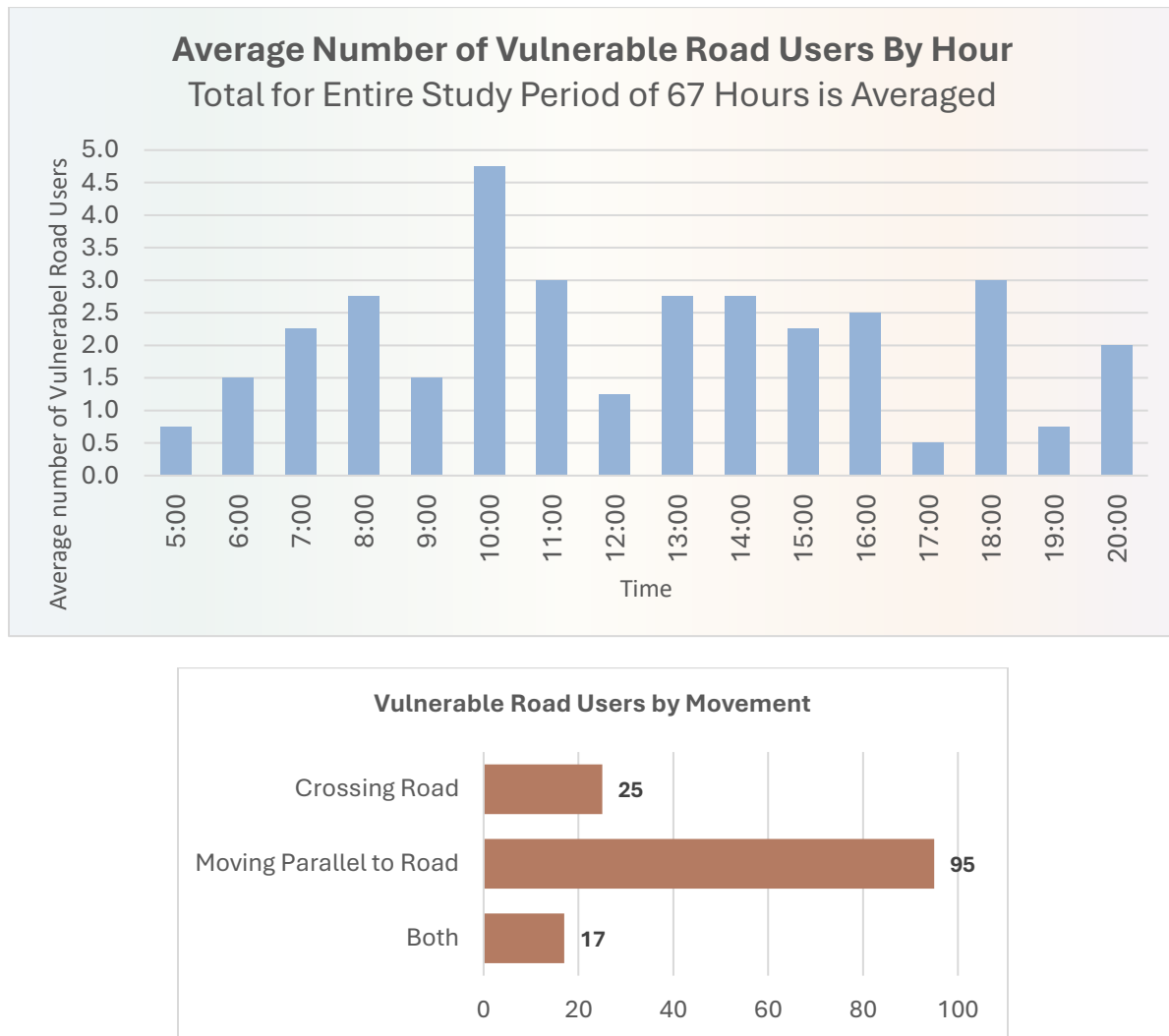


Vulnerable Road User Counts

The Federal Highway Administration defines a vulnerable road user (VRU) as a non-motorist such as a “pedestrian, bicyclist, other cyclist, and person on personal conveyance. A vulnerable road user may include people walking, biking, or rolling.”² This may include a worker in a construction work zone. The PVPC collected the data for pedestrians, bicyclists, and other vulnerable road users at this intersection by utilizing a low-resolution video camera to capture footage along the study area for a period of five days. This exercise resulted in three full days of data with 2 partial days (total 67 hours of footage).

A total of 137 VRUs were observed along the study area during this time period: 101 pedestrians, 35 bicyclists, and 1 horse and buggy rider. Charts in Figure 10 show the hourly distribution of these VRUs and the movement / location trends for entire duration of the data collection period.

Figure 10: Number of VRUs by Time of Day and Movement



² https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-10/VRU%20Safety%20Assessment%20Guidance%20FINAL_508.pdf

A majority of VRUs were observed between 10:00 am and 11:00 am. There is a noticeable VRU demand during the morning peak hours with a dip during midday after which the activity of VRUs again increases in the afternoon. This trend indicates a fairly consistent VRU presence during the hours of daylight. On an average a little over 35 VRUs (VRU ADT) were observed on a typical day. This is a significant number for a roadway located 5 miles away from the Town Center in a rural community. Due to the proximity to the Maples, many observed VRUs are elderly and walk at slower speeds. Table 3 summarizes the VRU patterns and conclusions based on the ADT distributed during different time periods of the day.

Table 3: VRU Patterns and Analyses

Time Period of Day	VRU Activity Level	Comments
5–6 AM	Low	Limited, off-peak activity
7–11 AM	High (Peak)	Significant Crossings during high Motor Vehicle Traffic Time
12–3 PM	Moderate–High	A slight Dip with continuing Demand
5:00 PM	Dip	Temporary reduction in VRU activity
6:00 PM	Secondary Peak	This indicates need for enhanced measures in the evening
7–8 PM	Declining	Least Demand but still requires Attention

A majority of the pedestrians and bicyclists in the study area travelled along the road parallel to the pavement. A significant number of VRUs were observed crossing the pavement to access the farm stand and return to the senior center or HCHC, while the majority of parallel to the roadway VRU movements were passer by trips with people most likely going to and from the Worthington Corners.

Crash History

The PVPC utilized the MassDOT’s IMPACT crash data portal and obtained crash reports from the Worthington Police Department to summarize the historic crash data for the section of Old North Road between the Worthington Corners roundabout in south to the intersection of Cummington Road in the north. A total of 8 crashes were reported in this area since 2015. Figure 11 is the map extracted from IMPACT which depicts the location of these crashes. Charts in Figure 12 highlight the crash trends. Table 4 summarizes the number of crashes by year. Table 5 is the summary of crash severity along the study area segment.

Table 4: Number of Crashes by Year

2015	1
2016	1
2018	1
2019	2
2020	2
2021	1
Total	8

Table 5: Crash Severity

No Apparent Injury	6
Possible Injury	1
Suspected Minor Injury	1
Total	8

Figure 11: Location of Crashes

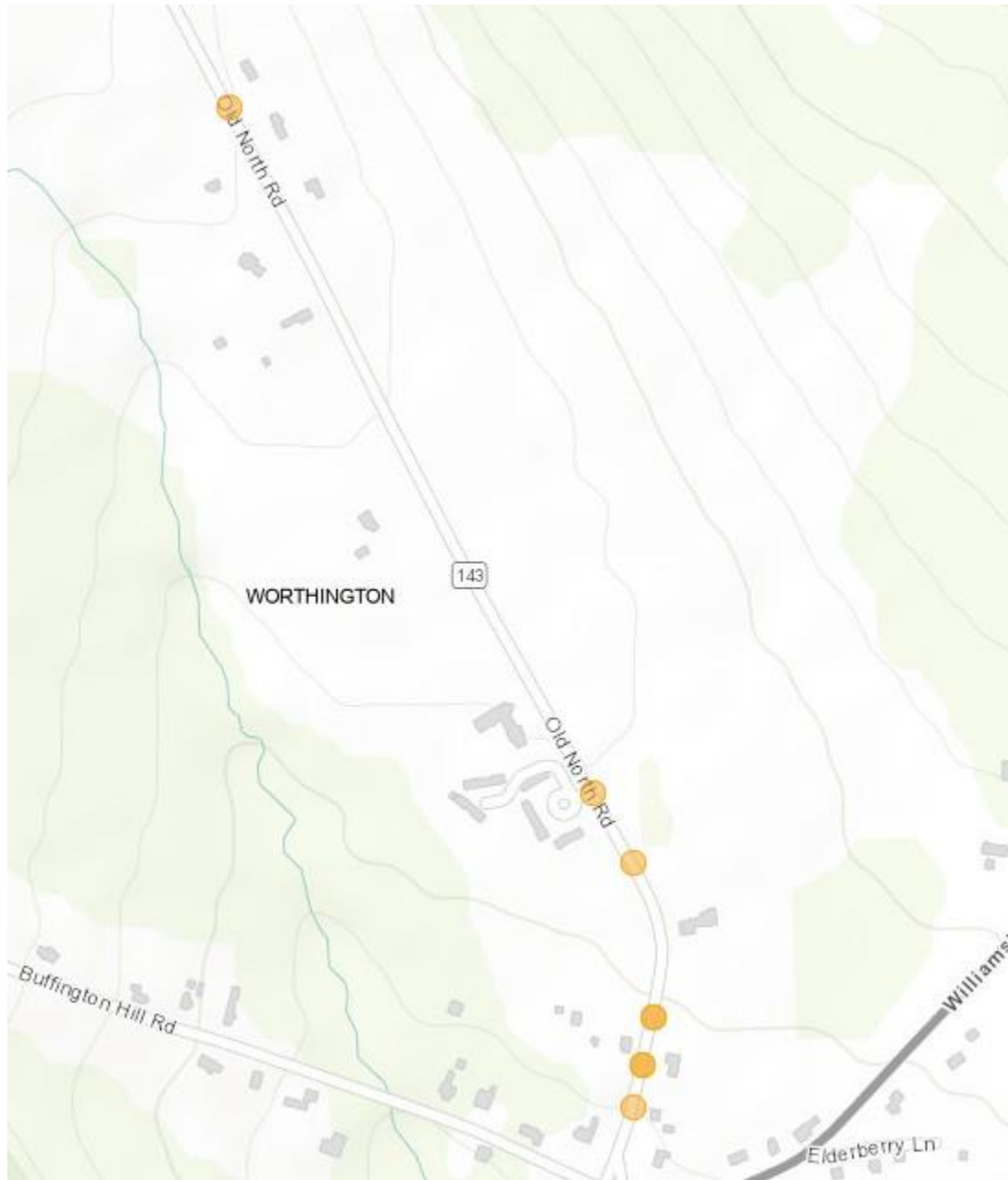
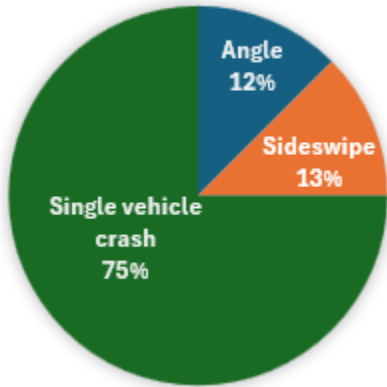
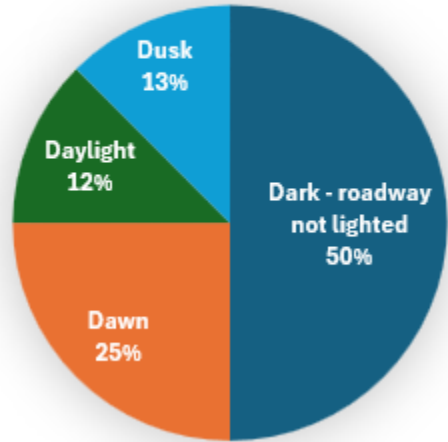


Figure 12: Crash Trends

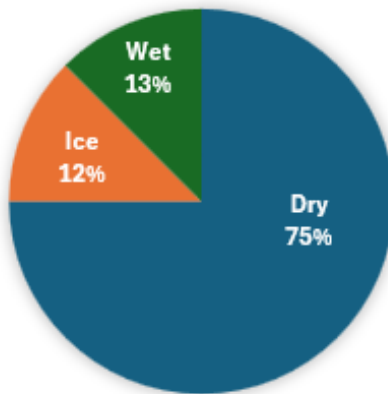
MANNER OF COLLISION



LIGHT CONDITIONS



ROAD CONDITIONS



Vulnerable Road User Safety Assessment (VRUSA)

To understand the VRU safety issues and to obtain input from stakeholders and VRU representatives and advocacy organizations in the Town, the PVPC organized a Vulnerable Road User Safety Assessment (VRUSA) in collaboration with the Town of Worthington, MassDOT, the Hilltown Community Development Corporation, representatives from the Maples Senior Housing and HCHC, and concerned residents. A team of multidisciplinary stake holders visited the study area to assess the conditions, to determine the issues, and discuss potential recommendations to improve multi modal traffic conditions in the area

Details

The VRUSA was conducted on Tuesday July 15th, 2025, between 9:00 am and noon, at the Town Hall in Worthington. It was attended by 25 people. The names of the attendees and the organizations they represent are summarized in Table 6.

Table 6: VRUSA Attendees

No.	Name	Organization	Email
1	Charley Rose	Worthington Select Board	crose@worthington-ma.us
2	John Scobie	Worthington Police Department	Scobiej@worthington.pd.org
3	Kate Bavelock	Worthington Planning Board	kbavelock@gmail.com
4	Nestor Matthews	Worthington Planning Board	nestor@matthewsstudio.com
5	Devon Wolf	Worthington Highway Superintendent	highway@worthington-ma.us
6	Peg O Neal	Worthington Executive Assistant	selectboard@worthington-ma.us
7	Marcia Estelle	The Maples	estellemarcia13@gmail.com
8	Patty Kimura	The Maples	maples@ehmchm.org
9	James S. Downey	Resident	james.downey@cushwake.com
10	Marian Welch	Resident	welchmaple1@gmail.com
11	Ed Lewis	Neighbor SH-14B	ed.lewis@edlewis.com
12	Chris Sorensen	MassDOT D1	Christopher.sorensen@dot.state.ma.us
13	Jose M. Arias Batista	MassDOT D1	Jose.m.ariasbatista@dot.state.ma.us
14	Lily Wallace	MassDOT D1	Lily.N.Wallace@dot.state.ma.us
15	Nathan Boerman	MassDOT D1	nathan.boerman@dot.state.ma.us
16	Peter Frieri	MassDOT D1	peter.frieri@dot.state.ma.us
17	Tessa Powe	MassDOT D1	Tessa.m.powe@dot.state.ma.us
18	David Watson	Hilltown CDC/Watson Active	david@watsonactive.com
19	Vickie Dempsey	Hilltown CDC COO	vdempsey@HCHCweb.org
20	Joan Griswold	Hilltown CDC	joang@hilltowncdc.org
21	Anu Sinha	PVPC	assinha@umass.edu
22	Cole Hartford	PVPC	chartford@umass.edu
23	Geoffrey Klafeta	PVPC	gklafeta@pvpc.org
24	Jeff McCollough	PVPC	jmccollough@pvpc.org
25	Khyati Parmar	PVPC	kparmar@pvpc.org

The Agenda for the meeting is attached as Appendix 6 and the Sign-in sheet is included in Appendix 7. The team assembled at the Town Hall and visited the site following a brief discussion of issues. They walked along the study area and surveyed the VRU desire lines and walked along the study area from the Maples Senior Center to the Worthington Corners Roundabout. They returned to the Town Hall after the site visit and to discuss improvement measures pertaining to observed problems.

Summary of Issues, Comments, and Potential Improvements

Table 7 summarizes the discussion during the VRUSA in terms of issues and recommendations to resolve those concerns. During the discussions, the team brainstormed all possible ideas and alternatives which are summarized here; however, the execution or implementation of the best suited improvement measures is subject to a thorough and detailed engineering study and assessment of short- and long-term implications of the measure.

Table 7: VRUSA Notes

Issues	Comments	Discussion
Speeding	- Speeding is a problem in both directions; however, southbound vehicles tend to have higher speeds than northbound vehicles. - The varying speed limits create confusion. - Speed humps are not favored by the Town as they lead to safety concerns for VRUs and difficulty in plowing. - Speeding has increased since recent roadway improvements have been implemented because of improved pavement and straightened road with wide lanes. - Town residents expressed concern of Route 143 becoming more of a “speedway” since the improvements were made. - Speeds change three times, and it creates confusion.	- Traffic calming is needed before the roundabout when approaching from the Town Hall. - The speed could stay at a standardized 35 MPH throughout the corridor. - Speed Humps could be installed. - A deceleration zone before the curve could be implemented. - A speed safety zone could be established along Route 143 in the vicinity of the HCHC and the Maples. - Possibility of establishing a Town-wide speed limit was discussed. - Pavement markings could be considered for slowing down traffic.

Issues	Comments	Discussion
Lack of Crosswalks	• VRUs, especially elderly pedestrians cross the road to smoke, as no smoking is allowed on the property. • Patrons and staff at HCHC walk along the road and sometimes cross the road to access the farm stand. • The farm stand has expanded its services and now provides additional grab and go meals and other refreshments, which increases the potential for crossing. • Residents also walk to the library, store, or cemetery at the Worthington Corners which requires that they cross the road in the vicinity of the study area. • There is a dog walking path behind the farm, and historically, the residents have crossed diagonally from the Maples Senior Housing Driveway to the historic farm stand pathway to access this dog park. • If raised crosswalks were to be implemented, it would be a problem for the snowplow. But they could improve safety. • Walking diagonally is dangerous, but people are used to doing it. Pedestrians would benefit from a clearer configuration. • A crosswalk directly from the elderly center would be too close to the curve and could be dangerous as there is limited visibility.	• It was suggested that there could be crosswalks implemented at the roundabout so that residents can go to the store or library. • A crosswalk could be installed connecting the HCHC to the farm stand and dog walking path. • An additional walking path between the two properties of the senior center and the rehab center would allow seniors to access onto adjacent property and provide connection to potential new crosswalk to cross the road safely. • This path could be constructed with a collaboration between the two property owners if it is installed outside the Town's right-of-way. • A similar path could also be constructed in the Town's right-of-way if approved by the Town and could also serve as a sidewalk. • The crosswalk could be installed along with a Rectangular Rapid Flashing Beacon (RRFB) with supplemental pedestrian overhead light. • The current desire line for crossing is towards the south of the study area and this location has limited visibility because of the curvature in the roadway and trees along the western side of the roadway. • An engineering study is needed to determine optimal location for a crosswalk. • Concerns were raised that placing the crosswalk too far north would discourage its use for those going towards the town commons and those used to crossing along historic desire lines.
Lack of Sidewalks	• Elderly pedestrians walk along the road to visit the library, store, or cemetery. • Lack of bicycle infrastructure and limited right-of-way	• Running a sidewalk from the farm stand to the roundabout was heavily discussed. • A sidewalk or side path leading to the trails by the farmland was discussed.

Issues	Comments	Discussion
	• If the right-of-way is not adequate, the possibility of constructing on private property would be difficult. • There is a historic stone wall on the eastern side of the road; constructing a sidewalk or a side path along that edge of the road would be challenging. • There was a debate over who would be responsible for the maintenance of the sidewalks – the private property owners or the town. There is no precedent for sidewalk maintenance because Worthington had no sidewalks until this year (The sidewalks were being constructed by MassDOT in the center of the Town at the time of the VRUSA). • One elderly resident walks daily in the west direction along the roadway shoulder to the cemetery to visit the grave of a recently deceased spouse. In current circumstances this resident is under high risk. • There is a hiking trail that is a popular hiking and dog walking destination. This should ideally connect to a sidewalk if one was built.	• If a shared use path were to be implemented, it would have to be separate from the roadway with vegetative buffer strip. • At a minimum, a sidewalk connecting the study area with the facilities along the Worthington Corners should be considered along either side of the roadway (Route 143). • Several stormwater drainage catch basins are located along both sides of the road. These catch basins will have to be replaced and relocated when a sidewalk is planned on either side of the pavement. • A connecting path/walkway between the rehab center and the senior center was proposed. • Such a path could be maintained over the winter by the business owners. • A barrier marked on pavement that protects pedestrians from cars was discussed. • 4 ft VRU signs were discussed. • The possibility of relocating historic stone wall was examined.
Visibility and Sight Distance	• Northbound visibility along Route 143 northwest of the Worthington Commons roundabout is limited because of the curvature in the roadway, so it would be difficult to see a crosswalk when approaching the senior center from the roundabout. • The trees located along the western side of the road further make it difficult to see VRUs crossing the road. • Police chief expressed concerns of the residents regarding lack of lighting. It is too dark in the rural community during nighttime which	• An appropriate location of a crosswalk with adequate visibility in both directions is primary requirement and an engineering study would be required to determine which of the desire lines satisfies these requirements. • Tall trees that block sight distance could be replaced with short shrubs so drivers can see pedestrians. • Streetlights should be installed, as it is too dark along the roadway at nighttime. • The trees also provide protection from heavy snow drifts and wind during winter. Measures to ensure

Issues	Comments	Discussion
	makes it difficult for both VRUs and motor vehicle drivers to see other road users. It was mentioned that streetlights were originally planned for this location.	their functionality should be considered. - The trees also provide the traffic calming effect under certain circumstances and clearing tree cover could potentially increase travel speeds, and therefore, that factor should be considered before cutting any more trees along the roadway. - The crosswalk needs to be accompanied by a streetlight. - If an RRFB is installed, it should also include the overhead pedestrian light.
Signage	- There is a lack of adequate warning signage in the area. - If a crosswalk is installed, additional signage is needed to inform drivers about its existence. - Signs should be large and visible. - Westbound speed limit sign (45 mph) immediately after passing the HCHC may encourage speeding. - More signage was widely agreed upon. E.g. Signs to inform motorists about pedestrians crossing, Go Slow, Roundabout Ahead, etc. - People sometimes see speed feedback signs along rural roads like these, and they speed up to see how fast they can go. - The green sign that alerts motorists in advance of the roundabout is very small. - MUTCD compliant signs with higher visibility are needed.	- Advance crosswalk ahead signs should be installed. - Westbound speed limit sign (45 mph) immediately after passing the HCHC should be removed. - Signs that have flashing lights along the edge should be considered; however, some residents feel as though they don't match the rural feel of the town. Also, they could be a nuisance at night. They also cost more to operate and maintain. They should only be considered after all other measures have been exhausted. - Additional speed limit signs should be included for consideration. - A 35-mph sign, a "dense area" sign before the curve, and warning signs before the roundabout were all recommended. - Westbound speed feedback sign may encourage speeding and should be removed, according to the Police Chief.
Snow	There is a strong westerly wind that pushes snow into the road and might impact the proposed sidewalk, so maintenance should be considered in the design stage.	Planting shrubs could help with snow drift along the roadway as the location is at a higher altitude and gets a lot of wind and snow. The tree warden would be responsible for determining the correct species to use.

Issues	Comments	Discussion
	• Cutting down trees could make the snow problem worse unless replaced by suitable species. • Maintenance and responsibility for sidewalk snow removal and related challenges was discussed in detail.	• Planting additional shrubbery could help with this snow drift as well as traffic calming.
Vehicles	• There has been a significant increase in heavy vehicle traffic on the roadway since the upgrades/reconstruction, including vehicles passing by from other towns. There has been a resulting increase in noise from braking around the roundabout. • Part of the reason there are more trucks is because the road has been widened and improved.	• Install signs to discourage speeding and information signs about the roundabout and advisory speed limit along the roundabout. • Implement traffic calming measures throughout the corridor to discourage heavy vehicles from speeding and braking often.
Fiscal / Financial and Other Challenges	• The implementation of improvements has several fiscal challenges related to the use of federal funds, including historical and cultural restrictions, as well as environmental restrictions. • The improvements conducted through TIP funds were planned and executed after detailed consultation with the Town and after collecting Town input and consensus on design and implementation at every level. • The project was a permitting nightmare. • Federal funds come with too many strings attached and cannot be used without other measures attached. • Maples housing requires section 504 compliance for ADA. • Issues include the replacement of drainage catch basins and ditches along both sides of the road • The historic stone wall along the east side in the vicinity of the Worthington Inn is a challenge if the desired path is to be followed for installation of a sidewalk.	• MassDOT did a comprehensive study on the right-of-way along Route 143, and the Town may have a copy. This would be useful for planning changes. • Any proposed improvements could be discussed in Town Wide meeting, and changes could be advocated and approved through proper channels and public hearing process. • The PVPC acknowledged the Town's desire about further research into the requirements of establishment of a 'Speed Safety Zone' in the study area and agreed to include the findings in the current study. • MassDOT's new Local Early and Actionable Planning (LEAP) Program is a very appropriate resource for the Town to get funds for an Engineering Study regarding the Speed Safety Zone establishment as well as determining the safe and appropriate location for a crosswalk installation. • LEAP could also be utilized to examine the feasibility of installing a crosswalk with an RRFB.

Issues	Comments	Discussion
	- Improvement measures like installing sidewalk, streetlights or flashing lights, or Warning Signs with flashing lights along the edge, do not align with the countryside character and rural feel of the road. - The need for an engineering study for establishment of a 'Speed Safety' Zone was discussed and challenged.	

Recommendations to Improve Transportation Conditions

The following recommendations are presented for the Town of Worthington to improve VRU safety and overall transportation conditions in the study area:

Establishing a Speed Safety Zone

More than 20% of vehicles traveling along Old North Road were recorded to travel at over 50 mph which is significantly higher than the posted speed limit. This finding reinforces stakeholders' concerns that speeding poses a serious risk to vulnerable road users in this area. Such high speeds significantly increase the probability of a serious injury or a fatality as result of a collision with a vulnerable road user. The residents of Worthington have expressed interest in establishment of a Speed Safety Zone along the study area and the need for the same is supported by the findings of this study.

According MassDOT's Procedures for Speed Zoning (Sec. 10-c, pp. 24-25) (Attached in Appendix 8), the Town of Worthington can set up a Safety Zone along State numbered roadways under local jurisdiction without requiring MassDOT approval in special circumstances such as in the current study area with a presence of a Health Care Center and Elderly Population. However, this process requires an Engineering Study to identify, define, and formalize the need and extent of such measure. It is recommended that the Town move forward with the next steps necessary to authorize an engineering study along the study area.

Installing a Crosswalk with a Rectangular Rapid Flashing Beacon

It is recommended that the Town of Worthington install a crosswalk with a Rectangular Rapid Flashing Beacon across Old North Road in the vicinity of the study area to connect the Maples Senior Housing, HCHC, and the farm stand across the road. This crosswalk should be constructed at an appropriate location with adequate sight distance and visibility for northwest bound traffic which has limited visibility because of the curvature along the roadway and the tree belt along the western side of Route 143. An Engineering Study along the study area would be required to determine the appropriate location for the crosswalk. The crosswalk should also be accompanied by appropriate Manual on Uniform Traffic Control Devices (MUTCD) approved advance warning signs and pavement markings to assure proper visibility and compliance.

MassDOT recommends that the lighting conditions along the crosswalk should be assessed as per Federal Highway's Guide for improving Pedestrian Safety at Uncontrolled Crossing Locations Table 1. chrome-

extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/docs/STEP-guide-improving-ped-safety.pdf

Applying for Local Early and Actionable Planning (LEAP) Program Grant

MassDOT's new **Local Early and Actionable Planning (LEAP) Program**³ provides planning and early-stage design support for municipally prioritized transportation infrastructure projects. These funds are primarily allocated for planning and design assistance for rural and gateway communities in the State. Engineering study assistance for this location in Worthington qualifies under this program guidelines and the Town can apply for the funding through Grant Central Website⁴.

Traffic Calming along Route 143

Over the past five-year period, more than 62 speeding violations have been recorded in Worthington, with 22 occurring along Old North Road in the vicinity of the study area. On a few occasions, officers reported vehicles traveling at speeds exceeding 70 mph. Besides these, the speed limits along the roadways in the Town vary along short segments of the roadways. The motorists have also reportedly increased speed along straight stretches of roadways with speed feedback signs for thrill and adventure purposes to see how fast they go and the maximum speed they can record on the sign. Under these circumstances it is recommended that the Town consider traffic calming measures via short- and long-term improvement plan for Route 143.

In the short term, it is recommended that the Town consider relocating the speed feedback sign located along the north of the study area to discourage speeding by thrill seekers. The Town widen the pavement edge lines. The Federal Highway Administration (FHWA) recognizes wider edge lines as a safety countermeasure. While its primary benefit is reducing roadway departure crashes, the enhanced visibility of the lane boundaries can also lead to a perception of a narrower road, which can encourage slower speeds. The FHWA notes that increasing the width from 4 inches to 6 inches enhances visibility for human drivers and automated systems and eventually provides benefits of slowing down the traffic. It is also recommended that the Town consider installing the regulatory 4 feet clearance signs which specify that motor vehicles should keep 4 feet clearance from VRUs while passing along Old North Road to ensure safety of the pedestrians, bicyclists, and other non-motorists in this area. These signs could also alert the drivers about potential VRU presence and encourage them to reduce their speed and proceed with caution.

Additionally, it was discussed at the VRU that more enhanced speed limit signs with retroreflective tape along the edge or flashing LED lights could be considered by the Town if there is agreement amongst the residents about these improvements.

In the long term, a corridor wide road diet and narrow traffic lanes by adding bike lanes and buffers along one side of the roadway could provide the benefit of slowing down motor vehicles and trucks. Planting more trees and shrubs along the roadway will provide the benefit of visually creating narrowing

³ <https://madothway.my.site.com/GrantCentral/s/leap-public-overview>

⁴ https://mbta.qualtrics.com/jfe/form/SV_d5YEu8i81ktYxIY

effect along the travel lanes as well provide protection from strong snow drifts along this segment of the road which is located at a higher altitude and has a history of strong wind gusts.

MassDOT recommends appropriate countermeasures enlisted in Federal Highway's Self-Enforcing Roadways - A Guidance Report (Tables 6 and 16) to estimate their effectiveness in reducing speed.

chrome-

extension://efaidnbmnnnibpcajpcgltclfindmkaj/https://www.fhwa.dot.gov/publications/research/safety/17098/17098.pdf

Walkway or Connecting Path

During the VRUSA, it was deliberated that the Town could aid the Maples Housing and the Hilltown Community Health Center to construct an Americans with Disabilities Act (ADA) compliant connecting path or walkway between the two properties. Such a path would provide a proper well defined walking area for the elderly residents. A formal walkway will also help define the walking path and guide the pedestrians to appropriate and safer crossing location. In other words, it could also help in relocating VRUs from the edge of the roadway with speeding vehicles to a safer paved path. It was discussed that the property owners would accept the responsibility of snow removal and general maintenance to help reduce the additional burden on Town's resources to maintain such a walkway. It is recommended that the stake holders and the elected officials of the Town continue this conversation to advance proper measures to implement this task.

Sidewalks

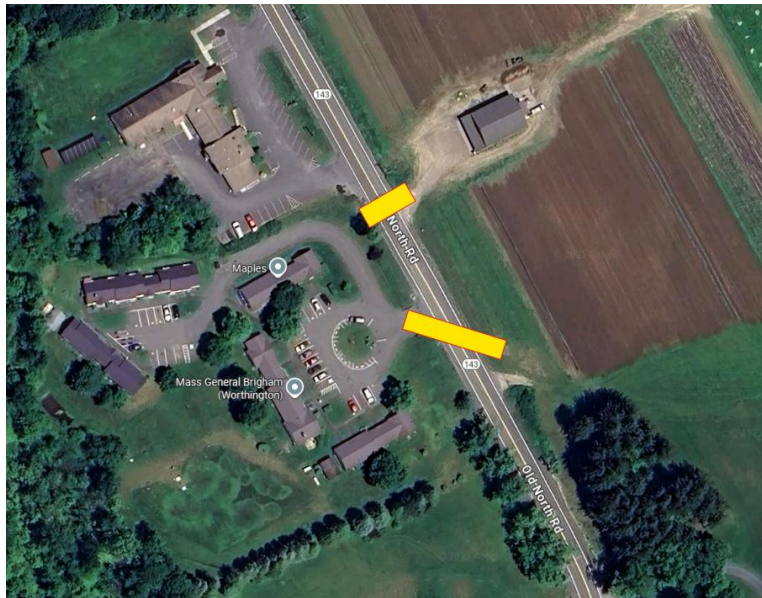
As discussed previously, the study area lacks sidewalks. There are narrow shoulders along both sides of the road. VRUs utilize the side of the pavement along the roadway to travel to and from the Worthington Corners. It is recommended that in long term, the Town consider installing sidewalks or a side path along one side of the roadway to help the residents access the facilities along the Worthington Corners.

Caution and Awareness

There are currently two predominant desire lines where the pedestrians cross Route 143. These are highlighted in Figure 13. The first path is immediately across from the driveway of the new farm stand and the second path is a diagonal track between the Maples driveway and the old farm stand dirt path which is also utilized to access the dog walking track as well as to travel further towards Worthington Corners. The second desire line located along the southern part of the study area is predominantly utilized by the residents of the Maples Senior Housing. This location is closer to the horizontal curve along Old North Road as such, it is not effectively visible to the northwest bound traffic because of the tree belt along the western side of the roadway, therefore it is unsafe for VRUs to cross diagonally along this path. It is recommended that the residents of the senior housing and the patrons and staff of HCHC are made aware of this fact and are encouraged to utilize safer practices to cross the road under current circumstances. An establishment of a formal walkway or path between the two properties along with some awareness could help in reducing these unsafe crossing practices and could also provide a

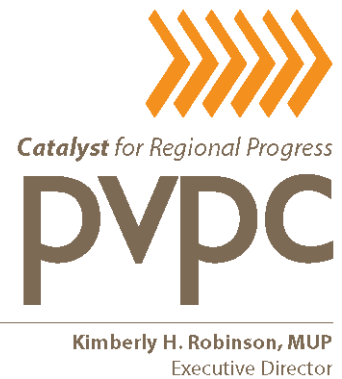
connection to a future crosswalk location appropriately identified by the recommended engineering study.

Figure 13: VRU desired crossing paths showing in Bright Yellow



APPENDIX 1

Solicitation Letter for Local Bike / Ped
Safety Study 2025



Date: January, 2025
To: Joint Transportation Committee Representatives
From: Gary Roux, Principal Planner/Traffic Manager
Subject: Requests for local safety study candidate locations

I invite you to submit locations to be considered for a safety planning study to be undertaken by the Pioneer Valley Planning Commission (PVPC) for your municipality's benefit. Through our funded work program, we are soliciting ideas for locations with bicycle, pedestrian, and other vulnerable road user safety concerns that would benefit from a planning study expected to begin in the summer of 2025.

Overall Eligibility

Municipalities can submit individual or multiple locations for consideration. Eligible projects include local jurisdiction roadways and MassDOT jurisdiction roadways (location must be within the public domain). All projects that address traffic safety for vulnerable road users will be considered. Project locations that advance racial equity, economic mobility, public health, access to transit, access to school, or address other safety concerns will also be considered.

Municipalities are the only eligible applicants for this program, and selected study locations must be authorized by the municipality's chief locally elected official. However, PVPC is committed to ensuring that groups traditionally under-represented in the planning process are engaged in projects.

The ideal candidate location will not have had a safety study or audit completed within the last five years. Further, locations awaiting funding through the Pioneer Valley Transportation Improvement Program (TIP) or in preliminary design will not be considered eligible.

More about Safety for Vulnerable Users

Bicycle and pedestrian crashes have been increasing in recent years. The advancement of studies to improve safety for vulnerable road users will identify necessary improvements to reverse this alarming trend.

PVPC has compiled recent data on high bicycle and pedestrian crash locations in the region. This data is provided as a resource and is not an inclusive list of locations for consideration.

[\(Map of Top Vulnerable Road User Crash Clusters Link\)](#)

[\(Table of Top Vulnerable Road User Crash Clusters Link\)](#)

Applying/Submitting a Project Location for a Bicycle -Pedestrian Safety Study.

Please submit a short project location description on municipal letterhead to Gary Roux (gmroux@pvpc.org) by March 1, 2025, and include the following:

1. Name of the municipality
2. Project Safety Study Location Description and Context: Provide a 1-3 sentence description of the project location. Provide an overview of project context, including geographic location and relevant previous and current planning efforts, e.g., plans, reports or studies or TIP project listing. (PVPC staff will work with the community and prepare a more detailed scope of work for the study)
3. Project Need and Alignment with Local, Regional, and State Goals: Describe the community needs the project will address, and its alignment with local, regional and/or state goals.
4. Community Engagement: Explain how local officials, community groups, businesses and/or institutions will be involved in the planning process, as appropriate.
5. Project Timeline: Outline any potential or anticipated opportunity to implement recommendations from the study.
6. Municipal Commitment: Describe the municipal commitment to the project and advance study recommendations to implementation.
7. Municipal Contribution: There is no match requirement (zero in-kind and/or financial contribution by the municipality)
8. Project Coordination: Provide the name and contact information of municipal staff or their designee that will assist PVPC in the study's implementation.
9. Signature: The submittal must be signed by the Mayor, City Manager, Town Manager/Administrator, or Select Board Chair.

Funding Sources

The Safety Study is funded through federal and state planning funds allocated through the Pioneer Valley Metropolitan Planning Organization's Unified Planning Work Program. No funds are available for design or construction.

Decision-Making Timeline

For consideration in 2025, communities are encouraged to submit candidate locations by March 1, 2025. Locations submitted after that date may be considered in future years. Candidate study locations will be brought to the April meeting of the Pioneer Valley Joint Transportation Committee for approval.

Discuss Potential Project Location with PVPC Staff

Please feel free to contact any member of the PVPC to discuss a potential project. A complete listing of transportation staff members is available at: <https://www.pvpc.org/about/staff>

APPENDIX 2

Traffic Volumes

Pioneer Valley Planning Commision

60 Congress Street
Springfield, MA 01104
(413) 781-6045 www.pvpc.org

Location : Worthington
Operator : DS, LB, CH
Counter # : 2515
Road Class : U5

Site Code: 10132
Station ID:
Old North Rd. N/O Buffington Rd.

6/16/2025	6/16/2025		6/17/2025		6/18/2025		6/19/2025		6/20/2025		Weekday Average		6/21/2025		6/22/2025	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	2	0	0	1	*	*	*	*	1	0	*	*	*	*
1:00	*	*	0	1	1	1	*	*	*	*	0	1	*	*	*	*
2:00	*	*	0	1	1	0	*	*	*	*	0	0	*	*	*	*
3:00	*	*	0	1	0	2	*	*	*	*	0	2	*	*	*	*
4:00	*	*	1	1	2	2	*	*	*	*	2	2	*	*	*	*
5:00	*	*	13	18	19	21	*	*	*	*	16	20	*	*	*	*
6:00	*	*	44	32	21	21	*	*	*	*	32	26	*	*	*	*
7:00	*	*	63	31	56	30	*	*	*	*	60	30	*	*	*	*
8:00	*	*	53	43	56	34	*	*	*	*	54	38	*	*	*	*
9:00	*	*	41	52	46	41	*	*	*	*	44	46	*	*	*	*
10:00	18	12	57	51	42	40	*	*	*	*	39	34	*	*	*	*
11:00	53	61	47	69	*	*	*	*	*	*	50	65	*	*	*	*
12:00 PM	56	60	50	48	*	*	*	*	*	*	53	54	*	*	*	*
1:00	49	63	68	67	*	*	*	*	*	*	58	65	*	*	*	*
2:00	54	52	59	58	*	*	*	*	*	*	56	55	*	*	*	*
3:00	65	67	52	60	*	*	*	*	*	*	58	64	*	*	*	*
4:00	50	84	48	70	*	*	*	*	*	*	49	77	*	*	*	*
5:00	56	57	52	62	*	*	*	*	*	*	54	60	*	*	*	*
6:00	37	38	27	38	*	*	*	*	*	*	32	38	*	*	*	*
7:00	25	33	20	15	*	*	*	*	*	*	22	24	*	*	*	*
8:00	24	14	21	21	*	*	*	*	*	*	22	18	*	*	*	*
9:00	18	9	13	10	*	*	*	*	*	*	16	10	*	*	*	*
10:00	9	5	4	3	*	*	*	*	*	*	6	4	*	*	*	*
11:00	3	4	3	2	*	*	*	*	*	*	3	3	*	*	*	*
Total	517	559	738	754	244	193	0	0	0	0	727	736	0	0	0	0
Day	1076		1492		437		0		0		1463		0		0	
AM Peak	11:00	11:00	7:00	11:00	7:00	9:00					7:00	11:00				
Volume	53	61	63	69	56	41					60	65				
PM Peak	3:00	4:00	1:00	4:00							1:00	4:00				
Volume	65	84	68	70							58	77				
Comb Total	1076		1492		437		0		0		1463		0		0	
ADT	ADT: 1,465		AADT: 1,465													

Pioneer Valley Planning Commision

60 Congress Street
Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington
Operator: DS, LB, CH
Counter #: 2517
Road Class: U5

Site Code: 10131
Station ID:
Old North Rd. S/O Cummington Rd

6/16/2025	Monday		Tuesday		Wednesday		Thursday		Friday		Weekday Average		Saturday		Sunday	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	0	2	*	*	*	*	*	*	0	2	*	*	*	*
1:00	*	*	1	0	*	*	*	*	*	*	1	0	*	*	*	*
2:00	*	*	1	0	*	*	*	*	*	*	1	0	*	*	*	*
3:00	*	*	1	0	*	*	*	*	*	*	1	0	*	*	*	*
4:00	*	*	1	1	*	*	*	*	*	*	1	1	*	*	*	*
5:00	*	*	18	13	*	*	*	*	*	*	18	13	*	*	*	*
6:00	*	*	32	38	*	*	*	*	*	*	32	38	*	*	*	*
7:00	*	*	38	49	*	*	*	*	*	*	38	49	*	*	*	*
8:00	*	*	45	34	*	*	*	*	*	*	45	34	*	*	*	*
9:00	5	8	44	32	*	*	*	*	*	*	24	20	*	*	*	*
10:00	38	51	44	42	*	*	*	*	*	*	41	46	*	*	*	*
11:00	58	51	53	42	*	*	*	*	*	*	56	46	*	*	*	*
12:00 PM	51	47	37	49	*	*	*	*	*	*	44	48	*	*	*	*
1:00	57	46	56	58	*	*	*	*	*	*	56	52	*	*	*	*
2:00	53	55	56	53	*	*	*	*	*	*	54	54	*	*	*	*
3:00	61	63	44	31	*	*	*	*	*	*	52	47	*	*	*	*
4:00	71	55	*	*	*	*	*	*	*	*	71	55	*	*	*	*
5:00	55	49	*	*	*	*	*	*	*	*	55	49	*	*	*	*
6:00	34	37	*	*	*	*	*	*	*	*	34	37	*	*	*	*
7:00	32	23	*	*	*	*	*	*	*	*	32	23	*	*	*	*
8:00	11	23	*	*	*	*	*	*	*	*	11	23	*	*	*	*
9:00	9	17	*	*	*	*	*	*	*	*	9	17	*	*	*	*
10:00	4	8	*	*	*	*	*	*	*	*	4	8	*	*	*	*
11:00	4	2	*	*	*	*	*	*	*	*	4	2	*	*	*	*
Total	543	535	471	444	0	0	0	0	0	0	684	664	0	0	0	0
Day	1078		915		0		0		0		1348		0		0	
AM Peak	11:00	10:00	11:00	7:00							11:00	7:00				
Volume	58	51	53	49							56	49				
PM Peak	4:00	3:00	1:00	1:00							4:00	4:00				
Volume	71	63	56	58							71	55				
Comb Total	1078		915		0		0		0		1348		0		0	
ADT	ADT: 1,350		AADT: 1,350													

APPENDIX 3

Route 143 Speed Limit Ordinance

January 7, 1993

TOWN OF WORTHINGTON
SPECIAL SPEED REGULATION # 780-B

Highway Location:	Worthington
Authority In Control:	Town of Worthington
Name of Highway (s):	Route 112 - Route 143

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

Hereby Adopted
by the Board of Selectmen
of the Town of Worthington

Special Speed Regulation number 780-A, dated December 31, 1980 is hereby amended by striking out the Regulation in its entirety and inserting in place thereof the following revisions and addenda.

That the following speed limits are established at which motor vehicles may be operated in the areas described:

Route 112 - Northbound

Beginning at the junction of Route 143 (Williamsburg Road),
thence northerly on Route 112;

0.19 miles at 25 miles per hour
 0.58 " " 30 " " "
 1.05 " " 40 " " "
 0.26 " " 35 " " " ending at the Worthington/
 Cummingtown Town Line; the total distance being 2.08 miles.

Route 112 - Southbound

Beginning at the Cummington/Worthington Town Line, thence southerly on Route 112;

0.26 miles at 35 miles per hour
1.05 " " 40 " " "
0.58 " " 30 " " "
0.19 " " 25 " " " ending at the junction of
Route 143 (Williamsburg Road), the total distance being 2.08 miles.

Route 143 - Eastbound

Beginning at the Peru/Worthington Town Line thence easterly on Route 143;

0.71	miles	at	35	miles	per	hour
0.30	"	"	30	"	"	"
1.94	"	"	35	"	"	"
2.35	"	"	45	"	"	"
0.21	"	"	35	"	"	"
0.20	"	"	25	"	"	"
0.70	"	"	40	"	"	"
0.66	"	"	35	"	"	"
0.50	"	"	40	"	"	"
0.19	"	"	30	"	"	"

ending at the Worthington/
Chesterfield Town Line; the total distance being 7.76 miles.

Route 143 - Westbound

Beginning at the Chesterfield/Worthington Town Line, thence westerly on Route 143;

0.19	miles	at	30	miles	per	hour
0.50	"	"	40	"	"	"
0.66	"	"	35	"	"	"
0.70	"	"	40	"	"	"
0.20	"	"	25	"	"	"
0.21	"	"	35	"	"	"
2.35	"	"	45	"	"	"
1.94	"	"	35	"	"	"
0.30	"	"	30	"	"	"
0.71	"	"	35	"	"	"

ending at the Worthington/
Peru Town Line; the total distance being 7.76 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed.).

Date of Passage Nor. 24, 1992

Robert M. E. Murphy
John J. Murphy
Stephen K. Kelleher
BOARD OF SELECTMEN

Attest D. Athena Mason
TOWN CLERK

COMMONWEALTH OF MASSACHUSETTS
HIGHWAY DEPARTMENT

SPECIAL SPEED REGULATION NO. 780-B

The Highway Department and the Registry of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interest.

Standard signs must be erected at the beginning of each zone.

DATE: January 7, 1993

FOR THE HIGHWAY DEPARTMENT

BY: Chas. J. Stetson
Traffic Engineer

FOR THE REGISTRY OF MOTOR VEHICLES

BY: William T. Hentel
Chief Deputy Registrar

APPENDIX 4

Traffic Speeds

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: NB

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	0	0	0	2	4	8	4	0	0	0	0	0	18
11:00	0	0	2	2	8	20	19	2	0	0	0	0	53
12:00 PM	0	1	1	6	6	25	14	3	0	0	0	0	56
1:00	2	0	0	6	9	16	11	4	0	0	0	1	49
2:00	0	0	0	2	8	24	14	5	1	0	0	0	54
3:00	0	0	1	1	9	26	23	5	0	0	0	0	65
4:00	0	0	1	3	6	16	17	7	0	0	0	0	50
5:00	0	0	0	2	7	21	19	7	0	0	0	0	56
6:00	0	0	1	1	4	15	11	3	1	0	0	1	37
7:00	0	0	1	3	0	6	9	4	1	1	0	0	25
8:00	0	0	1	2	4	6	7	4	0	0	0	0	24
9:00	0	0	0	0	3	5	7	1	2	0	0	0	18
10:00	0	0	0	0	2	2	1	3	0	0	0	1	9
11:00	0	0	0	0	0	0	0	2	0	1	0	0	3
Total	2	1	8	30	70	190	156	50	5	2	0	3	517

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: NB

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	2
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	1	0	0	0	1
5:00	0	0	0	0	0	4	6	2	1	0	0	0	13
6:00	0	1	3	2	5	9	11	10	2	1	0	0	44
7:00	0	0	1	4	6	24	22	4	2	0	0	0	63
8:00	0	1	0	8	12	15	12	3	2	0	0	0	53
9:00	0	0	1	7	12	11	7	2	0	0	1	0	41
10:00	0	0	3	10	16	13	11	3	0	0	0	1	57
11:00	0	0	0	7	11	13	11	4	1	0	0	0	47
12:00 PM	0	1	0	4	10	17	12	4	2	0	0	0	50
1:00	1	0	1	9	18	15	18	6	0	0	0	0	68
2:00	0	0	2	4	7	27	13	6	0	0	0	0	59
3:00	0	1	3	4	4	20	15	4	0	1	0	0	52
4:00	0	0	3	4	4	12	22	3	0	0	0	0	48
5:00	0	0	0	0	4	11	29	6	2	0	0	0	52
6:00	0	0	0	1	7	10	6	3	0	0	0	0	27
7:00	0	0	0	0	3	4	10	3	0	0	0	0	20
8:00	0	1	0	1	4	6	7	1	0	1	0	0	21
9:00	0	0	0	2	1	6	3	1	0	0	0	0	13
10:00	0	0	0	0	0	0	2	2	0	0	0	0	4
11:00	0	0	0	1	0	1	0	1	0	0	0	0	3
Total	1	5	17	68	124	218	219	68	13	3	1	1	738

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: NB

6/18/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	1	0	0	0	0	1
2:00	0	0	0	0	0	0	0	0	1	0	0	0	1
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	1	1	0	0	0	0	0	2
5:00	0	1	0	0	0	6	2	8	2	0	0	0	19
6:00	0	1	0	1	1	4	8	5	1	0	0	0	21
7:00	0	0	2	2	6	17	18	9	2	0	0	0	56
8:00	0	0	0	0	15	20	15	5	0	1	0	0	56
9:00	0	0	0	5	5	12	20	3	1	0	0	0	46
10:00	0	0	3	2	6	17	13	1	0	0	0	0	42
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
12:00 PM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	0	2	5	10	33	77	77	32	7	1	0	0	244
Grand Total	3	8	30	108	227	485	452	150	25	6	1	4	1499

Stats

Percentile	15th	50th	85th	95th
Speed	31	38	44	47
Mean Speed (Average)	38.9			
10 MPH Pace Speed	36-45			
Number in Pace	907			
Percent in Pace	62.0%			
Number > 35 MPH	1123			
Percent > 35 MPH	74.9%			

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: SB

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	0	1	2	3	2	2	2	0	0	0	0	0	12
11:00	0	0	2	8	8	21	18	4	0	0	0	0	61
12:00 PM	0	0	2	5	19	20	12	2	0	0	0	0	60
1:00	0	0	0	6	23	17	14	2	1	0	0	0	63
2:00	0	1	1	4	9	23	12	2	0	0	0	0	52
3:00	0	0	2	5	13	31	10	5	1	0	0	0	67
4:00	0	1	2	4	16	42	16	1	2	0	0	0	84
5:00	0	0	2	1	14	26	10	4	0	0	0	0	57
6:00	0	0	1	2	5	14	11	3	1	1	0	0	38
7:00	0	0	0	1	9	12	9	1	1	0	0	0	33
8:00	1	0	1	1	2	7	1	1	0	0	0	0	14
9:00	0	0	0	0	4	1	3	0	1	0	0	0	9
10:00	0	0	0	0	0	2	1	1	0	1	0	0	5
11:00	0	0	0	1	0	1	2	0	0	0	0	0	4
Total	1	3	15	41	124	219	121	26	7	2	0	0	559

Pioneer Valley Planning Commision

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Location: Worthington
Operator: DS, LB, CH
Counter #: 2515
Road Class: U5
Direction: SB

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	1	0	0	0	0	0	1
2:00	0	0	0	0	0	0	1	0	0	0	0	0	1
3:00	0	0	0	0	0	0	0	1	0	0	0	0	1
4:00	0	0	0	1	0	0	0	0	0	0	0	0	1
5:00	0	0	0	0	0	2	6	7	2	1	0	0	18
6:00	0	1	1	0	3	7	13	6	1	0	0	0	32
7:00	0	0	0	0	5	17	8	0	1	0	0	0	31
8:00	0	0	1	4	4	16	12	5	0	1	0	0	43
9:00	0	0	2	8	7	19	16	0	0	0	0	0	52
10:00	0	1	1	11	10	18	10	0	0	0	0	0	51
11:00	0	0	1	12	19	18	18	1	0	0	0	0	69
12:00 PM	0	0	1	7	14	13	9	4	0	0	0	0	48
1:00	0	0	3	3	19	23	16	3	0	0	0	0	67
2:00	0	0	3	4	13	14	19	3	2	0	0	0	58
3:00	0	0	4	3	14	22	15	2	0	0	0	0	60
4:00	0	1	1	3	12	23	22	8	0	0	0	0	70
5:00	0	0	2	1	15	20	18	6	0	0	0	0	62
6:00	0	0	3	1	3	17	9	4	1	0	0	0	38
7:00	0	0	0	0	4	5	5	1	0	0	0	0	15
8:00	0	0	0	0	7	6	4	4	0	0	0	0	21
9:00	0	0	1	1	4	3	0	1	0	0	0	0	10
10:00	0	0	0	0	2	1	0	0	0	0	0	0	3
11:00	0	0	0	0	0	1	1	0	0	0	0	0	2
Total	0	3	24	59	155	245	203	56	7	2	0	0	754

Pioneer Valley Planning Commision

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Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: SB

6/18/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1
1:00	0	0	0	0	0	1	0	0	0	0	0	0	1
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	1	1	0	0	0	0	2
4:00	0	0	0	0	1	0	1	0	0	0	0	0	2
5:00	0	0	1	0	0	2	5	9	4	0	0	0	21
6:00	0	0	0	0	3	7	6	5	0	0	0	0	21
7:00	0	0	0	2	4	13	6	4	1	0	0	0	30
8:00	0	0	2	1	4	14	11	2	0	0	0	0	34
9:00	0	0	0	1	13	14	11	2	0	0	0	0	41
10:00	0	1	3	7	7	14	6	1	1	0	0	0	40
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
12:00 PM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	0	1	6	11	32	66	47	24	6	0	0	0	193
Grand Total	1	7	45	111	311	530	371	106	20	4	0	0	1506

Stats

Percentile	15th	50th	85th	95th
Speed	31	37	42	46
Mean Speed (Average)	37.7			
10 MPH Pace Speed	34-43			
Number in Pace	885			
Percent in Pace	60.0%			
Number > 35 MPH	1031			
Percent > 35 MPH	68.5%			

Pioneer Valley Planning Commision

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Location: Worthington

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Counter #: 2515

Road Class: U5

Direction: Combined

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	0	1	2	5	6	10	6	0	0	0	0	0	30
11:00	0	0	4	10	16	41	37	6	0	0	0	0	114
12:00 PM	0	1	3	11	25	45	26	5	0	0	0	0	116
1:00	2	0	0	12	32	33	25	6	1	0	0	1	112
2:00	0	1	1	6	17	47	26	7	1	0	0	0	106
3:00	0	0	3	6	22	57	33	10	1	0	0	0	132
4:00	0	1	3	7	22	58	33	8	2	0	0	0	134
5:00	0	0	2	3	21	47	29	11	0	0	0	0	113
6:00	0	0	2	3	9	29	22	6	2	1	0	1	75
7:00	0	0	1	4	9	18	18	5	2	1	0	0	58
8:00	1	0	2	3	6	13	8	5	0	0	0	0	38
9:00	0	0	0	0	7	6	10	1	3	0	0	0	27
10:00	0	0	0	0	2	4	2	4	0	1	0	1	14
11:00	0	0	0	1	0	1	2	2	0	1	0	0	7
Total	3	4	23	71	194	409	277	76	12	4	0	3	1076

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Direction: Combined

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	2
1:00	0	0	0	0	0	0	1	0	0	0	0	0	1
2:00	0	0	0	0	0	0	1	0	0	0	0	0	1
3:00	0	0	0	0	0	0	0	1	0	0	0	0	1
4:00	0	0	0	1	0	0	0	0	1	0	0	0	2
5:00	0	0	0	0	0	6	12	9	3	1	0	0	31
6:00	0	2	4	2	8	16	24	16	3	1	0	0	76
7:00	0	0	1	4	11	41	30	4	3	0	0	0	94
8:00	0	1	1	12	16	31	24	8	2	1	0	0	96
9:00	0	0	3	15	19	30	23	2	0	0	1	0	93
10:00	0	1	4	21	26	31	21	3	0	0	0	1	108
11:00	0	0	1	19	30	31	29	5	1	0	0	0	116
12:00 PM	0	1	1	11	24	30	21	8	2	0	0	0	98
1:00	1	0	4	12	37	38	34	9	0	0	0	0	135
2:00	0	0	5	8	20	41	32	9	2	0	0	0	117
3:00	0	1	7	7	18	42	30	6	0	1	0	0	112
4:00	0	1	4	7	16	35	44	11	0	0	0	0	118
5:00	0	0	2	1	19	31	47	12	2	0	0	0	114
6:00	0	0	3	2	10	27	15	7	1	0	0	0	65
7:00	0	0	0	0	7	9	15	4	0	0	0	0	35
8:00	0	1	0	1	11	12	11	5	0	1	0	0	42
9:00	0	0	1	3	5	9	3	2	0	0	0	0	23
10:00	0	0	0	0	2	1	2	2	0	0	0	0	7
11:00	0	0	0	1	0	2	1	1	0	0	0	0	5
Total	1	8	41	127	279	463	422	124	20	5	1	1	1492

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2515

Road Class: U5

Direction: Combined

Site Code: 10132

Station ID:

Old North Rd. N/O Buffington Rd.

6/18/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1
1:00	0	0	0	0	0	1	0	1	0	0	0	0	2
2:00	0	0	0	0	0	0	0	0	1	0	0	0	1
3:00	0	0	0	0	0	0	1	1	0	0	0	0	2
4:00	0	0	0	0	1	1	2	0	0	0	0	0	4
5:00	0	1	1	0	0	8	7	17	6	0	0	0	40
6:00	0	1	0	1	4	11	14	10	1	0	0	0	42
7:00	0	0	2	4	10	30	24	13	3	0	0	0	86
8:00	0	0	2	1	19	34	26	7	0	1	0	0	90
9:00	0	0	0	6	18	26	31	5	1	0	0	0	87
10:00	0	1	6	9	13	31	19	2	1	0	0	0	82
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
12:00 PM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	0	3	11	21	65	143	124	56	13	1	0	0	437
Grand Total	4	15	75	219	538	1015	823	256	45	10	1	4	3005

Stats	Percentile	15th	50th	85th	95th
	Speed	31	37	43	46
	Mean Speed (Average)	38.3			
	10 MPH Pace Speed	36-45			
	Number in Pace	1788			
	Percent in Pace	61.0%			
	Number > 35 MPH	2154			
	Percent > 35 MPH	71.7%			

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2517

Road Class: U5

Direction: SB

Site Code: 10131

Station ID:

Old North Rd. S/O Cummington Rd

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH		
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	0	0	1	0	0	4	0	0	0	0	0	0	5
10:00	0	0	1	0	3	3	12	12	6	1	0	0	38
11:00	0	0	0	0	2	4	21	18	9	3	0	1	58
12:00 PM	0	0	0	0	0	1	13	22	13	2	0	0	51
1:00	0	0	1	0	0	6	21	18	9	1	1	0	57
2:00	1	0	0	0	0	3	16	20	11	1	1	0	53
3:00	0	0	0	0	2	0	23	23	10	2	1	0	61
4:00	0	0	1	0	0	3	15	38	12	1	0	1	71
5:00	0	0	3	0	1	1	9	31	8	1	1	0	55
6:00	0	0	0	0	0	3	14	6	8	1	1	0	34
7:00	0	0	0	0	0	2	7	12	8	3	0	0	32
8:00	0	0	0	0	1	1	0	5	2	2	0	0	11
9:00	0	0	0	0	0	0	5	0	2	0	0	0	9
10:00	0	0	0	0	0	0	1	1	0	2	0	0	4
11:00	0	0	0	0	0	1	0	2	1	0	0	0	4
Total	1	0	7	0	9	32	157	208	99	20	5	2	543

Pioneer Valley Planning Commision

60 Congress Street
Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington
Operator: DS, LB, CH
Counter #: 2517
Road Class: U5
Direction: SB

Site Code: 10131
Station ID:
Old North Rd. S/O Cummington Rd

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	1	0	0	0	1
2:00	0	0	0	0	0	0	0	1	0	0	0	0	1
3:00	0	0	0	0	0	0	0	0	1	0	0	0	1
4:00	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00	0	0	0	0	0	0	4	2	5	6	1	0	18
6:00	0	0	0	0	0	2	1	13	9	6	1	0	32
7:00	0	0	0	0	1	2	15	17	3	0	0	0	38
8:00	0	0	0	0	0	2	11	12	14	4	0	1	45
9:00	0	0	0	0	0	5	13	19	6	1	0	0	44
10:00	0	1	1	1	9	13	9	8	1	1	0	0	44
11:00	0	0	0	1	5	6	13	16	9	3	0	0	53
12:00 PM	0	0	0	2	2	2	12	12	7	0	0	0	37
1:00	0	0	0	0	0	4	11	19	16	6	0	0	56
2:00	1	0	0	0	0	5	14	16	9	4	4	2	56
3:00	0	0	0	0	0	1	10	12	7	6	4	4	44
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	1	1	1	4	18	42	113	147	86	39	10	7	471
Grand Total	2	1	8	4	27	74	270	355	185	59	15	9	1014
Stats	Percentile												
	Speed												
	Mean Speed (Average)												
	10 MPH Pace Speed												
	Number in Pace												
	Percent in Pace												
	Number > 45 MPH												
	Percent > 45 MPH												

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2517

Road Class: U5

Direction: NB

Site Code: 10131

Station ID:

Old North Rd. S/O Cummington Rd

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	0	0	0	0	4	2	2	0	0	0	0	0	8
10:00	0	0	0	2	1	10	12	13	11	1	0	0	51
11:00	0	0	0	0	2	2	19	17	8	3	0	0	51
12:00 PM	0	0	0	1	1	8	15	13	9	0	0	0	47
1:00	0	0	0	0	3	5	13	9	9	4	2	0	46
2:00	0	0	0	0	0	6	17	21	7	2	2	0	55
3:00	0	0	0	0	0	5	22	22	12	1	1	0	63
4:00	0	0	1	0	0	5	9	31	9	0	0	0	55
5:00	0	0	0	0	0	3	9	17	14	4	2	0	49
6:00	0	0	0	0	0	4	8	15	4	4	1	0	37
7:00	0	0	0	0	0	2	5	7	5	2	1	0	23
8:00	0	0	0	1	2	4	4	5	5	2	0	0	23
9:00	0	0	0	0	0	2	3	4	6	2	0	0	17
10:00	0	0	0	0	1	0	1	2	1	2	0	0	8
11:00	0	0	0	0	0	0	0	0	0	1	1	0	2
Total	0	0	1	4	14	58	139	176	100	28	10	0	535

Pioneer Valley Planning Commision

60 Congress Street
Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington
Operator: DS, LB, CH
Counter #: 2517
Road Class: U5
Direction: NB

Site Code: 10131
Station ID:
Old North Rd. S/O Cummington Rd

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	1	0	1	0	0	0	2
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	1	0	1
5:00	0	0	0	0	0	1	2	3	5	2	0	0	13
6:00	0	0	0	0	0	2	6	10	14	3	2	1	38
7:00	0	0	0	0	1	0	5	23	16	4	0	0	49
8:00	0	0	0	1	0	2	4	18	6	0	2	1	34
9:00	0	0	0	0	2	4	10	9	5	1	1	0	32
10:00	0	0	0	1	11	15	10	4	1	0	0	0	42
11:00	0	0	1	1	4	10	10	9	6	1	0	0	42
12:00 PM	0	0	2	2	1	9	10	16	6	1	2	0	49
1:00	1	0	0	0	8	16	15	8	9	1	0	0	58
2:00	0	0	0	0	1	13	19	15	4	1	0	0	53
3:00	0	0	0	0	1	7	13	4	4	1	1	0	31
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	1	0	3	5	29	79	104	120	76	16	8	3	444
Grand Total	1	0	4	9	43	137	243	296	176	44	18	3	979

Stats	Percentile	15th	50th	85th	95th
	Speed	38	45	51	56
	Mean Speed (Average)	46.1			
	10 MPH Pace Speed	42-51			
	Number in Pace	523			
	Percent in Pace	55.0%			
	Number > 45 MPH	542			
	Percent > 45 MPH	55.4%			

Pioneer Valley Planning Commision

60 Congress Street

Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington

Operator: DS, LB, CH

Counter #: 2517

Road Class: U5

Direction: Combined

Site Code: 10131

Station ID:

Old North Rd. S/O Cummington Rd

6/16/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	0
1:00	*	*	*	*	*	*	*	*	*	*	*	*	0
2:00	*	*	*	*	*	*	*	*	*	*	*	*	0
3:00	*	*	*	*	*	*	*	*	*	*	*	*	0
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	0	0	1	0	4	6	2	0	0	0	0	0	13
10:00	0	0	1	2	4	13	24	25	17	2	0	0	89
11:00	0	0	0	0	4	6	40	35	17	6	0	1	109
12:00 PM	0	0	0	1	1	9	28	35	22	2	0	0	98
1:00	0	0	1	0	3	11	34	27	18	5	3	0	103
2:00	1	0	0	0	0	9	33	41	18	3	3	0	108
3:00	0	0	0	0	2	5	45	45	22	3	2	0	124
4:00	0	0	2	0	0	8	24	69	21	1	0	1	126
5:00	0	0	3	0	1	4	18	48	22	5	3	0	104
6:00	0	0	0	0	0	7	22	21	12	5	2	0	71
7:00	0	0	0	0	0	4	12	19	13	5	1	0	55
8:00	0	0	0	1	3	5	4	10	7	4	0	0	34
9:00	0	0	0	0	0	2	8	4	8	2	0	0	26
10:00	0	0	0	0	1	0	2	3	1	4	0	0	12
11:00	0	0	0	0	0	1	0	2	1	1	1	0	6
Total	1	0	8	4	23	90	296	384	199	48	15	2	1078

Pioneer Valley Planning Commision

60 Congress Street
Springfield, MA 01104

(413) 781-6045 www.pvpc.org

Location: Worthington
Operator: DS, LB, CH
Counter #: 2517
Road Class: U5
Direction: Combined

Site Code: 10131
Station ID:
Old North Rd. S/O Cummington Rd

6/17/2025	> 15 - 20	> 20 - 25	> 25 - 30	> 30 - 35	> 35 - 40	> 40 - 45	> 45 - 50	> 50 - 55	> 55 - 60	> 60 - 65	> 65 - 70	> 70 MPH	Total
Time 0 - 15 MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH MPH													
12:00 AM	0	0	0	0	0	0	1	0	1	0	0	0	2
1:00	0	0	0	0	0	0	0	0	1	0	0	0	1
2:00	0	0	0	0	0	0	1	0	0	0	0	0	1
3:00	0	0	0	0	0	0	0	0	1	0	0	0	1
4:00	0	0	0	0	1	0	0	0	0	0	1	0	2
5:00	0	0	0	0	0	1	6	5	10	8	1	0	31
6:00	0	0	0	0	0	4	7	23	23	9	3	1	70
7:00	0	0	0	0	2	2	20	40	19	4	0	0	87
8:00	0	0	0	1	0	4	15	30	20	4	2	2	79
9:00	0	0	0	0	2	9	23	28	11	2	1	0	76
10:00	0	1	1	2	20	28	19	12	2	1	0	0	86
11:00	0	0	1	2	9	16	23	25	15	4	0	0	95
12:00 PM	0	0	2	4	3	11	22	28	13	1	2	0	86
1:00	1	0	0	0	8	20	26	27	25	7	0	0	114
2:00	1	0	0	0	1	18	33	31	13	5	4	2	109
3:00	0	0	0	0	1	8	23	16	11	7	5	4	75
4:00	*	*	*	*	*	*	*	*	*	*	*	*	0
5:00	*	*	*	*	*	*	*	*	*	*	*	*	0
6:00	*	*	*	*	*	*	*	*	*	*	*	*	0
7:00	*	*	*	*	*	*	*	*	*	*	*	*	0
8:00	*	*	*	*	*	*	*	*	*	*	*	*	0
9:00	*	*	*	*	*	*	*	*	*	*	*	*	0
10:00	*	*	*	*	*	*	*	*	*	*	*	*	0
11:00	*	*	*	*	*	*	*	*	*	*	*	*	0
Total	2	1	4	9	47	121	217	267	162	55	18	10	915
Grand Total	3	1	12	13	70	211	513	651	361	103	33	12	1993
Stats	Percentile												
	Speed												
	Mean Speed (Average)												
	10 MPH Pace Speed												
	Number in Pace												
	Percent in Pace												
	Number > 45 MPH												
	Percent > 45 MPH												

APPENDIX 5

VRUSA Agenda

Vulnerable Road User Safety Assessment (VRUSA)

Old North Road (Route 143) in the vicinity of the Senior Housing, Health Center, and Four Corners Farm Stand Worthington

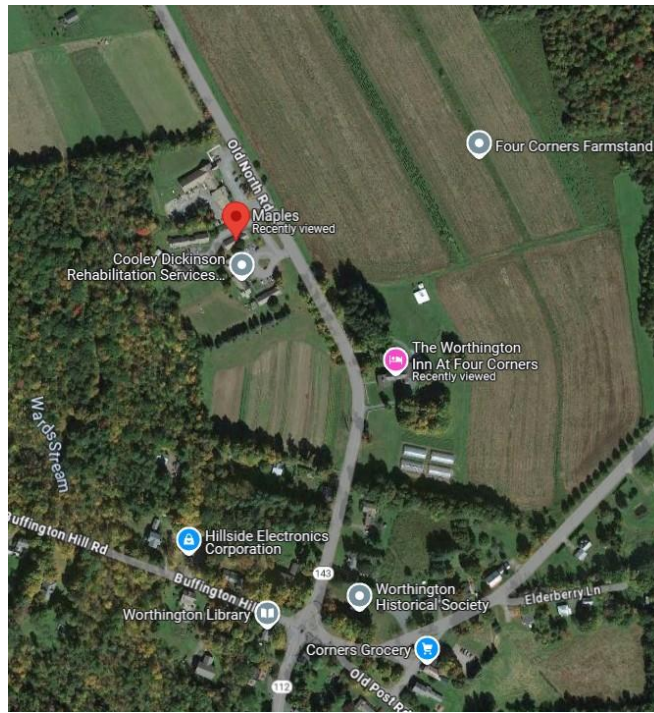
VRUSA involves walking along the study area

Tuesday July 15th, 2025

9:00 am – 12:00 pm (The Assessment will proceed Rain or Shine)

Advice to dress appropriately with comfortable walking shoes and weather appropriate clothing

Please wear Safety vests and other safety gear as per your organization's policy



AGENDA

- | | |
|---------------------|---|
| 09:00 am – 09:15 am | Meet at the Town Hall, 160 Huntington Road |
| 09:15 am – 10:00 am | Discussion regarding the issues and concerns. |
| 10:00 am – 10:30 am | Visit the Study Area. On-site Assessment. The group will take a walk of the study area. PVPC staff will note down the comments. |
| 10:30 am – 10:45 am | Back to the Town Hall |
| 10:45 am – 12:00 pm | Discussion on Issues and Recommendations. |

APPENDIX 6

VRUSA Sign-In Sheet

Old North Road, Worthington, VRUSA

Tuesday July 15th, 2025

9:00 am

Sign-In Sheet

No.	Name	Organization	Email
1	Khyati Parmar	PVPC	kparmar@pvpc.org
2	Patty Kimura	Maples	maples@ehmchm.org
3	Nathan Boerman	MassDOT	nathan.boerman@dot.state.ma.us
4	Tessa Powe	MassDOT	tessa.m.powe@dot.state.ma.us
5	Jose M. Arias Batista	MassDOT	Jose.m.ariasbatista@dot.state.ma.us
6	David Watson	WatsonActive/ Hilltown CDC	david@watsonactive.com
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9	Marcia Estelle	The Maples	estellemarcia13@gmail.com
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18	Anu Sinha	PVPC	assinha@umass.edu
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20	Nestar Matthews	Worthington Planning Bd	nestar@matthnewsstudio.com
21	John Seaba	Worthington PD	SeabaJ@Worthingtonpd.org
22.	James S. Downey	Resident	james.downey@cushwake.com

Old North Road, Worthington, VRUSA

Tuesday July 15th, 2025

9:00 am

Sign-In Sheet

23	Marian Welch	Resident	welchmaple.1@gmail.com
24	Vicki Dempsey	CEO Hi/HomCHC	vdempsey@HCHCweb.org
25	Geoffrey Klafeta	PVPC	gKlafeta@pvpc.org
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Lighting along the driveway

Health center lighting

APPENDIX 7

Massachusetts Department of
Transportation's Procedures for Speed
Zoning

10.a Advisory Speed Signs and Plaques

Advisory speed plaques are used to supplement other warning signs of a condition that may require a reduction in operating speed. Advisory speeds are most commonly used to supplement horizontal alignment signs such as Turn (MUTCD code W1-1), Curve (W1-2), or Winding Road (W1-5), but may be used under condition where a geometric or other roadside condition necessitates an advisory speed. *Advisory speed plaques (W13-1P), displaying “XX MPH” cannot be used alone; they must supplement a primary warning sign.*

The speed exhibited on all advisory speed signs and plaques is the maximum comfortable and safe speed, rather than an actual speed limit, so the signs are designed with a black legend on a yellow background. Advisory speeds are not enforceable limits.

Use of a ball-bank indicator is the simplest and most widely used device to measure safe, comfortable speeds on horizontal curves. A ball-bank indicator is a curved level that measures the combined effect of the body roll angle, the centrifugal force, and the superelevation angle as a vehicle negotiates a horizontal curve at various speeds.

In order to properly set advisory speeds through changes in horizontal alignment, the guidance found in FHWA’s *Procedures for Setting Advisory Speeds on Curves* should be incorporated. If a ball-bank indicator is used, **Table 10-1** should be the basis of the criteria for determining the advisory speed through horizontal curves:

Ball-Bank Reading	Speed
16 degrees	20 mph or less
14 degrees	25 mph to 30 mph
12 degrees	35 mph and higher

Table 10-1: Maximum Ball-Bank Readings for Various Advisory Speeds (Source: MUTCD)

In addition to the use of a ball-bank indicator, other methods to determine advisory speeds through curves include manual calculation using a design speed equation or driving the curves using an accelerometer that can provide a determination of the side friction factors.

The use of advisory speed plaques in conjunction with Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), combination Curve/Intersection (W10-1 series), Chevrons (W1-8), One Direction Large Arrow (W1-6) shall conform to the Table 2C-5 of the MUTCD. These standards are based upon the difference between the speed limit and the calculated advisory speed. If the speed limit is:

- 10 mph or greater than the calculated advisory speed, an advisory speed plaque must be used;
- 5 mph greater than the calculated advisory speed, an advisory speed plaque is optional; and
- Equal to or less than the calculated advisory speed, an advisory speed plaque cannot be used.*

**Under this condition it is strongly encouraged to perform a speed study on the tangent sections of road upstream and downstream from the horizontal curve to determine if the speed limit has been set artificially*



Fig. 10-1: W1-1 Sign w/ W13-1P Plaque
(Source: MUTCD)

low. While seemingly counterintuitive, it may be appropriate to raise the speed limit to a rate that matches travel speeds on tangent sections in order to fully utilize proper curve warning signs and advisory speed plaques.

Advisory speed signs and plaques may be installed by municipalities on any locally-owned street or highway without permission from MassDOT as long as the selected speed is based on an engineering study and their use conforms to the MUTCD.

10.b Reduced Speed Limit Ahead Signs



Fig. 10-2: W3-5 Sign
(Source: MUTCD)

Reduced Speed Limit Ahead (MUTCD code W3-5) signs are warning signs that inform road users of an upcoming reduction in the regulatory speed limit. The MUTCD recommends their use any time the speed limit is being reduced by more than 10 mph. When used properly it can be an effective tool to reduce the likelihood of sudden drops in free-flow speed.

Under conditions where a School Zone will reduce the speed limit by 10 mph or more, a Reduced School Zone Speed Limit ahead (S4-5) sign should be used in place of a standard Reduced Speed Limit Ahead sign.

Reduced Speed Limit Ahead signs are advisory and cannot be used in place of a regulatory Speed Limit sign. The legal speed limit becomes enforceable only at the point at which the Speed Limit sign is placed.

10.c Safety Zone Speed Limits

Safety Zone speed limits are the only regulatory speed limits that municipalities can adopt on city- and town-owned ways without approval from MassDOT. Safety Zones cannot be placed on State Highway without prior written approval of MassDOT. Speed limits within a Safety Zone must be set at 20 mph and are intended to be used in areas where vulnerable road users are likely to be present, such as parks and playgrounds, senior citizen housing and centers, hospitals or other medical facilities, high schools and higher education centers, and daycare facilities. Please note that Safety Zones should not be used in place of School Zones for streets adjacent to grades 1-8 schools.

To establish a Safety Zone, the following minimum criteria should apply:

- The street should be adjacent to a land use that is likely to attract vulnerable road users.
- The Safety Zone should contain one or more areas that have potential conflicts between motor vehicles and vulnerable road users that warrant a reduction in speeds such as crosswalks, driveways, or side streets.
- The minimum length of the Safety Zone should be at least $\frac{1}{4}$ of a mile and it should not extend more than 500' beyond a side street unless an applicable land use continues along the adjacent block.

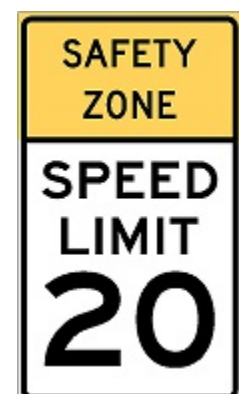


Fig. 10-3:
MA-R2-8 Sign

Regulatory speed limit signs, including Safety Zone speed limit signs, are required to conform to the MUTCD, per MGL c. 85 § 2. Therefore, an engineering study must be performed to validate the posting of

signage. The engineering study “shall include an analysis of the current speed distribution of free-flowing vehicles.”

Proper signage is also necessary to inform road users of the downstream end of a Safety Zone. In an area where a legal Special Speed Regulation has been enacted, the Safety Zone should be terminated with a Speed Limit (MUTCD code R2-1) sign that corresponds to the regulatory limit shown in the regulation. If the Safety Zone is in an area that has no Special Speed Regulation, it should be terminated with an End Speed Zone (MassDOT code MA-R2-7) sign.

Cities and towns are responsible for modifying their Municipal Traffic Code to reflect the locations of all Safety Zones prior to the posting any signage.

10.d School Zone Speed Limits

School Zone speed limits are a statutory speed limit but may be marked with regulatory (black legend on white background) signage. Speed limits within a School Zone must be set at 20 mph, but the limit is only in effect during days of the week and hours of the day when children are accessing the school grounds. School Zone warrants, design, and operation are governed by the Massachusetts Amendments to the MUTCD. The following is a summary of these criteria, but the full document should be reviewed to ensure all standards are met:

- The school property abuts the public right of way within the limits of the proposed School Zone;
- School children have direct access to the street or roadway from the school property;
- There is a marked, ADA-compliant crosswalk within the School Zone; and
- The school includes one or more grades between Grade 1 and Grade 8, inclusive.



Fig. 10-4: R2-1 Sign with S4-3P and S4-1P Plaques (Source: MUTCD)

Cities and towns are responsible for modifying their Municipal Traffic Code to reflect the locations and days and times of operation for all School Zones prior to the posting any signage. The sign assembly that is used to identify the school zone speed limit for drivers should be similar to Fig. 10-4; the assembly may also contain sign plaques stating the days of the week and times of day (MUTCD code S4-6P) or “When Children Are Present” (S4-2P) or it may be supplemented with either a single yellow flashing beacon above the sign, or one yellow flashing beacon above and one below the sign that flash alternately, and a plaque stating “When Flashing” (S4-4P).

10.e Thickly Settled or Business Districts

Thickly Settled or Business Districts, as defined in MGL c. 90 § 1, have a default statutory speed limit of 30 mph unless the municipality has adopted MGL c. 90 § 17C., wherein the statutory speed limit in these areas is reduced to 25 mph. However, if a Special Speed Regulation has been enacted on this section of roadway the regulatory speed will govern. With exception to School Zone Speed Limits discussed in Section 9.d, *Special Speed Regulations will always supersede a statutory speed limit.*

A municipality has the option of adopting MGL c. 90 § 17C on either a city- or town-wide basis or on a street-by-street basis. MassDOT recommends the former since it allows for consistent messaging and is less likely to create confusion for motor vehicle operators. In addition, adopting the 25 mph statutory limit on a city- or town-wide basis will allow vehicles to place MA-R2-9A or MA-R2-9B regulatory (black legend on white background) signs on municipal ways at jurisdictional boundaries while staying in conformance with the MUTCD, whereas MA-W13-4 warning (black legend on yellow background) signs may only be used for individual streets (Fig. 10-5).

Cities and towns are responsible for modifying their Municipal Traffic Code if they have adopted the 25 mph statutory limit in Thickly Settled or Business Districts. In the case that it is adopted on a street-by-street basis, those streets and the extents of those limits should clearly be identified. In addition, MGL c. 90 § 17C requires the municipality to notify MassDOT if the 25 mph statutory limit is adopted.

A thickly settled or business district is "the territory contiguous to any way which is built up with structures devoted to business, or the territory contiguous to any way where dwelling houses are situated at such distances as will average less than two hundred feet between them for a distance of a quarter of a mile or over."

--- MGL c. 90 § 1

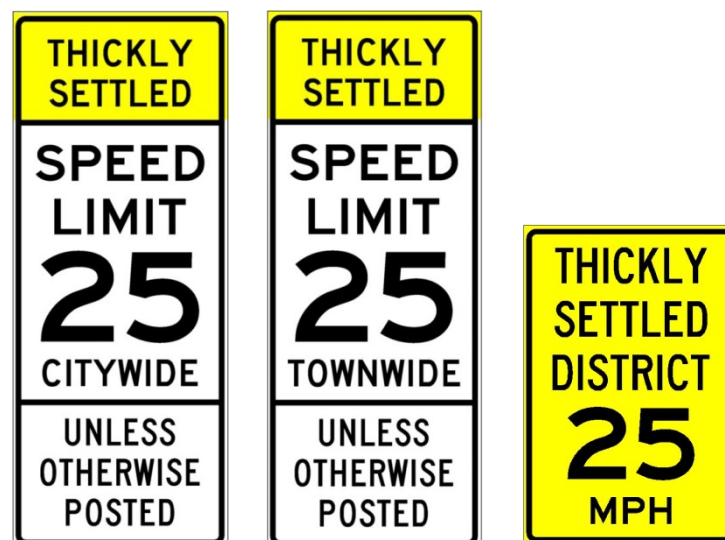


Fig. 10-5: MA-R2-9A, MA-R2-9B, and MA-W13-4 Signs

10.f Speed Feedback Signs

Speed Feedback Signs (SFS) may be a valuable tool in reducing vehicle speeds under many different conditions, including work zones, areas where it is not possible to make physical roadway changes, or where constant police enforcement is not practical. Newer SFS systems may also log and store speeds over time so that the owner may track changes to speed profiles over time to determine its effectiveness and also to identify possible patterns of violators which can be used to deploy enforcement at times when it will be most efficient.

However, SFS systems are not a panacea for long-term reductions in speed profiles under all conditions. Under most scenarios, general speeds will drop immediately after installation due to a “novelty” effect of the device; the extent speeds increase back to the pre-installation rate over time is oftentimes related to the setting in which it was installed. Research has shown that SFS systems are not effective everywhere, and when used they may only be effective over short distances.^{7,8,9} Therefore, MassDOT advises that SFS systems are limited to the following conditions:

- In School Zones, where the speed limit may vary by times of day;
- In Transition Zones, where a regulatory speed limit decreases;
- On approaches to signalized intersections on high-speed roadways; and
- In work zones, where traffic flow may unexpectedly slow or stop.

A SFS should always be installed below a speed limit sign; it should never be installed by itself. In addition, MassDOT advises that the size of the “Speed Limit” and number legends should be mimicked by the “Your Speed” and the changeable speed display legends.

⁷ Rose, Elisabeth R. and Ullman, Gerald L., *Evaluation of Dynamic Speed Display Signs*, (College Station, TX: Texas Transportation Institute, September, 2003).

⁸ Jeihani, Mansoureh, et al, *Evaluating the Effectiveness of Dynamic Speed Display Signs*, (Baltimore, MD: Morgan State University, September, 2012).

⁹ Sandberg, Wayne, et al, *Long-Term Effectiveness of Dynamic Speed Monitoring Displays for Speed Management at Speed Limit Transitions*, (Washington, Dakota, and Ramsey Counties, MN: 2009).